The Miner's Guide

A Ready Handbook for the Prospector and Miner

Compiled by

HORACE J. WEST

340 WILCOX BUILDING

LOS ANGELES, CALIFORNIA

PRICE, ONE DOLLAR

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By Horace J. West

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Preface

Realizing that there will be great activity in the near future in prospecting and in metal mining, because of the great rewards in wealth for the individual, and the attracting, for that reason, of intelligent men to mining, I have written this little book to aid and advise those who will engage in the same.

Even the veteran prospector for minerals may find that this book contains valuable information for him, as the author is a veteran prospector and practical miner of thirty-five years wide and varied experience. The author hopes this book will fill the purpose for which it is written.

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The Prospector and His Needs

Well, I remember my first experience in the mining field. I practically knew nothing of the business, and it was a mystery to me. I would have given quite a sum for just such a book as this. Meeting with a veteran prospector, I asked him for information in regard to how to discover and where to go for minerals. His answer was very simple. "Go," he said, "until you find a country that contains many different rocks of various hues and colors, then begin looking for minerals." In long years of practice I have found this to be more or less true.

The would-be explorer for minerals must first equip himself with the necessary transportation to carry him and his necessary camp equipment to the mineral bearing zones. This transportation will consist of whatever means the individual may decide upon, a great deal depending upon what kind of country you intend to explore, for instance, there will be sections that are accessible to automobiles, and there will be others only accessible with pack animals, but for the best efficiency in going into out of the way places and for general usefulness, I recommend the pack animals. If your trip takes you into a timbered and grass country Horses or Mules are the best, on the contrary, if your trip takes you into the great Southwest where the Desert prevails and vegetation is scant and water scarcer, then I

recommend the Burro or Donkey for your pack animals. These animals are hardy, faithful and will pack a burden of 125 pounds all day without much effort, live and thrive on the Desert vegetation and go for a greater length of time on less water than the horse or mule.

While traveling from district to district, it is easy to make 25 miles per day with these animals and this is speed enough for the prospector, as it gives him an opportunity to observe the country as he goes through. There is no greater mistake for the prospector for minerals than to get in a hurry. The successful prospector and locator of minerals is the person with the observant eye and a brain quick to deduct inferences from what that eye has seen, this he cannot do if he gets in a rush; many is the time a veteran prospector has lost his opportunity by being in too great haste when some keen methodical man came behind him and located a Bonanza.

In the event you decide on prospecting in the great Southwest where the Desert abounds, a semi-arid region and water holes are few and far between, I would advise for your transportation for one man, three burros or donkeys, one to use for a saddle animal which you will find very convenient to jump on and ride when you get tired of walking. The best part of this arrangement is that when you tire of riding you can walk and drive your animals ahead of you, and when you tire of walking you can ride and drive your pack ahead of you. In addition you will require two pack saddles and one light riding saddle, and saddle blankets for

each animal, two lash ropes for your pack, one for each, a pair of hobbles for each animal, a good toned bell and two lash chinches for your lash. Ropes, to be used in binding the pack on the animals, and this tying on of the pack must be done in a thorough manner or you will have trouble during the day's travel which will lead to much torture for your animals and possible sore backs for them, and great worry and inconvenience for yourself, so lash your packs on thoroughly.

One animal will carry sufficient provisions for you to last one month, the other should be equipped with water cans of the capacity of twenty gallons, ten gallons to each can to balance the pack, which will be sufficient to make what is known as a dry camp, or sufficient water to last to the next water hole or well, which the individual himself must prepare for by specific knowledge of the section which he intends to explore, which he can gain from many sources; late maps, information from local residents, and the universal practice of Counties placing indestructible sign boards showing the direction and distance to water holes and wells, and different points.

Your equipment for the trip should practically consist of the following—three burros or donkeys, one light riding saddle, two pack saddles, two lash ropes, half-inch manilla, and two lash chinches, two pieces of heavy canvas to cover both packs, one kyack for your provisions which is a double receptacle of identical proportions each, that hang on each side of the pack animal, and must be evenly matched in

weight on each side; this kyack can be made of different kinds of material, you can have a pair of canvas bags made of the same dimensions, or you can use two coal oil cases, one for each side, by boring holes and inserting rope for hangers on the pack saddle. I found that coal oil cases were the best for the reason you can carry cooked foodstuff with greater safety than any other way, and besides it is a much cheaper arrangement.

In addition to this you will need a miner's gold pan, a prospecting pick, a half-gallon mortar and pestle to crush rock to the proper fineness for testing the minerals, a miner's horn or metal spoon which can be bought at any good hardware store, for washing or panning the pulverized rock in order to separate the minerals from the rock. You will need a few simple cooking utensils, such as a frying pan, a stew-pot of about one-half gallon, two or three small mixing pans for various needs, such as mixing bread; two or three tin or graniteware plates, two cups, two knives and forks, one butcher knife, two small spoons, two tablespoons, and one small coffee pot, a three-quart canteen to provide you with drinking water as desired, one miner's pick and shovel, a spring point shovel is the best, and about a three-pound pick will be found very satisfactory, a small axe or hatchet will come in very handy, a tepee or sibley tent 7x7 feet, having a center pole made in two pieces that is cut in two in the center which will give you a length of about three feet to each piece which can be joined with a socket made of tin or galvanized iron. This sectionized pole will be easy to put

on your pack and is very convenient. You will need a bed and a canvas, six feet wide by fourteen feet long. This size canvas will enable you to make your bed on one-half of it and pulling the other half over the bed and tucking the sides under the bed prevents insects and reptiles from creeping into your bed and also prevents the cold winds of winter from getting under your blankets. Your bedding is a matter of individual choice, you may be satisfied with one, two or three blankets, but my experience has been that a standard sized comforter folded in the center makes a very good mattress and one good blanket together with your bed canvas as described above will be sufficient to make you comfortable in any kind of weather; a folding cot is very good to pack in the summer but is very cold to use in the winter, the closer to the ground one sleeps outdoors in the cold weather the warmer he sleeps, in fact in very severe cold weather in camping out I have frequently dug shallow holes for my bed, which I found to be much warmer than making it entirely on the surface.

In regard to food for the trip, that will be up to the individual taste. I have found in many years' camping that dried fruits, cereals, potatoes, bacon and ham, sugar, coffee, flour, onions, beans and the trimmings that go with them, such as pepper, salt, baking powder, etc., are the best for a long, hard trip, as the quantity you can carry will go farther and last longer than any other kind of food, the cooking of which is very simple, anyone can be his own cook and prevent the danger of ptomaine poisoning which one so fre-

quently gets from eating canned food; canned milk is about the only canned goods I would suggest.

This completes your equipment for the exploring or prospecting trip. By the addition of another riding animal and another three-quart canteen you will have an outfit sufficient for two men, and it is advisable for the novice in starting out to make up his outfit from some mining camp, for at such a place you can always get just what you need and a great deal of practical advice, and the suggestion should here be made that the novice should induce some congenial partner who is experienced to some degree in prospecting to accompany him on the trip. This kind of arrangement can invariably be made in mining camps, and you will gain more valuable information by this method of operation than all the books that are written on this subject will teach you This book is written more for the purpose of giving advice than giving a technical knowledge of geology, mineralogy and such things that go with the science of the mining industry.

Without the prospector there would be no mining and the world would yet be in the stone age. He is not appreciated at anything like his real worth. He requires ability and experience, push and perseverance. Prospecting is a search for valuable minerals. He may not be very deeply learned in either geology or mineralogy, but he must have a keen eye and good natural powers of observation, and above all else must be an optimist; a pessimist and a successful prospector do not go together.

It is well to remember that one of the principal things that makes for success in prospecting is to make money out of your locations or finds; if you make a location of mineral that you cannot work at a profit yourself, with the limited means at a prospector's disposal, whatever you can sell this kind of location for is like finding money on the road; another party with more capital than you may see his way to work the claim at a profit and make you an offer to buy, if so, sell by all means. Further on will be found the business part of mining which you should pay particular attention to, as it is just as essential to success as the finding and locating of minerals.

Locating a Claim

All mineral lands are open to occupation and purchase by any citizen, or he who has declared his intentions to become a citizen of the United States.

The locator of a mining claim has the exclusive right of possession and enjoyment of all the surface of his claim and of all veins, lodes or ledges throughout their entire length, the top or apex which lies inside his surface lines extending vertically downward. The owner of a mining claim may follow his ledge or vein should its dip carry him beyond his side lines extended vertically down, so long as he does not trespass on the surface of another claim; but in no case can he go beyond his end lines, which must in all cases be parallel.

No lode claim can be recorded until a vein or lode has been discovered thereon.

A full lode or vein claim consists of 1500 linear feet along the course or strike of the vein or lode and 300 feet on each side of the center of the vein or lode; the notice of location should be posted within the boundary lines of the claim. A good and sure way to locate a claim it to post your notice in the center of the claim which will read 750 feet each way.

The notice of location must contain first, the name of the claim; second, the name of the locator or locators; third,

the date of the location; fourth, the number of linear feet claimed in length along the course or strike of the vein each way from the point of discovery, with the width on each side of the center of the vein, and the general course or strike of the vein or lode as near as may be; fifth, the location and description of each corner with the markings thereon.

Here is an example of locating a vein or lode claim. Suppose the strike or course of the vein is north and south and you post your notice in the center of the claim, this being your discovery point, you will measure off 750 feet south to the south end center, where you must build a rock monument or set a post at least four feet high from the surface on this post or monument. It is advisable to post a notice designating what it is, for instance, it should read south end center of the ..... mining claim, from this point you measure 300 feet east, setting another post or rock monument of the same height, calling post the southeast corner, thence you measure 1500 feet north, setting another post, this being the northeast corner; thence you measure 300 feet west setting another post, this being the north end center; thence you measure 300 feet west, setting another post, this being the northwest corner; thence measure 1500 feet south, setting another post, this being the southwest corner; thence measure 300 feet east which brings you back to the place of beginning, being the south end center. It is much more satisfactory and more quickly done to set your end centers first and measure 300 feet on each side of it, marking your corners as described before, but

your notice of location should describe the boundaries of the claim as stated above.

Every state has different laws regulating mining, not conflicting with the United States laws, and it will be well to become acquainted with the mining laws of the state you are prospecting in. Most states require a discovery shaft, open cut, or sufficient work to show mineral in place 10 feet in depth from the surface at the lowest rim of the shaft or open cut; where the state has no special mining laws of its own the United States mining statutes alone prevail. Every mining location notice must be recorded in the county records of the county it is located in; it must contain a description so accurate that a person never on the ground could take a copy of the notice from the county records and go straight to the claim; this is what the records are for, and you should be very particular as to describing the locality your claim is situated in, describing permanent natural objects and well known places, their distance and directions from claim.

PLACER LOCATIONS.

Every citizen or one who has declared his intentions to become one, as stated above, is entitled to locate twenty-acre claims of placer ground, which means all other mineral claims, except vein, lode or ledge mineral; where the land is surveyed you must make your boundary lines conform to subdivisions, if not surveyed you can locate it in any angle provided you make all corners with the proper post as stated above in lode claims.

By locating what is termed an associated claim, eight locators can locate 160 acres in a solid piece of ground, which is quite frequently done, giving the advantage of a large piece of ground in compact form. This kind of claim must be named and corners posted the same as an individual twenty-acre claim.

How To Test For Minerals

A little general knowledge of the character of rocks will prove of great assistance to the prospector. For example, he should be able to distinguish between igneous rocks and aqueous rocks, as very different classes of mineral are common to them. Aqueous rocks are water formed, igneous are fire-formed. One need never look for coal, for example, in volcanic formation. On the other hand, metalliferous veins are not to be sought adjacent to coal beds. Certain minerals and groups of minerals are associated with certain kinds of rock. Gold is most commonly found in quartz, though there is scarecly a kind of rock known in which gold is sometimes not found.

The minerals most commonly associated with limestone are zinc and lead. In a hornblend formation one may look for chrome iron, asbestos, soapstone, gold, silver and copper. In shale he may look for coal, fireclay, iron, rock salt and gypsum. In granite the precious metals, tin and its allied metals molybdenum, etc.

The volcanic regions offer a field for the gem prospector; also the precious metals, sulphur and a variety of other minerals.

Ancient lake beds, or sinks in the hot desert regions are the natural depositories of soluble minerals such as borax, nitre, soda and the like.

There are many minerals other than silver, gold, copper, tin, lead, iron, coal and the most common and better known minerals which are very valuable. A few of these may be mentioned:

Asbestos	Magnesite	Platinum
Asphaltum	Manganese	Quicksilver
Borax	Ozokerite	Zinc
Bromine	Monazite	Barium
Chrome	Saltpeter	Beryllium
Cobalt	Soapstone	Erbium
Copperas	Sodium Nitrate	Curium
Graphite	Sulphur	Lithium Nitrate
Gypsum	Antimony	Rhodium
Zirconium Nitrate	Iridium	Thorium Nitrate

When the prospector wishes to know the name of the specimen he holds in his hand, he considers all the following properties, crystalline form and structure, clearage, fracture, tenacity, hardness, specific gravity as comparsed with water, color and streak, transparency or otherwise, taste, odor, chemical composition tested by analysis, character as determined by the blow pipe, mode of occurrence and associated minerals; crystalline form and structure is too complicated for the average prospector to grasp without a special study.

Cleavage is the line of easiest separation in a mineral, it may be perfect, imperfect, interrupted, etc.

Fracture referring to any surface except that of a cleavage may be uneven, conchoidal (shell-like, hackly, rough, etc.).

Tenacity refers to such qualities as brittle, sectile, malleable, flexible, or elastic.

Hardness is represented by the difficulty with which a surface is scratched. The scale on general ore was devised by Mohs; it is **first**, talc scratched by the fingernail; **second**, gypsum scratched by fingernail but with more difficulty, will not scratch a copper coin; **third**, calcite, scratched by a copper coin; **fourth**, Fluorite is not scratched by a copper coin and does not scratch glass; **fifth**, apatite scratches glass but with difficulty, is readily scratched by a knife; **sixth**, Feldspar scratches glass with ease, is difficult to scratch with knife; **seventh**, quartz cannot be scratched by a knife and readily scratches glass; **eighth**, topaz, harder; **ninth**, corundium, harder; **tenth**, diamond scratches any other substance.

Specific gravity: This is the density of mineral and other substances compared with that of water. It is particularly valuable in determining heavy metals.

To find the specific gravity of any solid body divide its weight in air by the loss of weight in water at a temperature as near 60° F. as possible and the quotient will equal the specific gravity.

Lustre: There are seven kinds of lustre, metallic, the lustre of metals—Adamantine that of the diamond; vitreous or broken glass; resinous of the yellow resines; greasy; pearly; silky. There are five degrees of intensity of lustre recognized—splendent; shining; glistening; glimmering; dull.

Color and streak: The streak is the color of the powder of the mineral when rubbed on unglazed porcelain, or scratched with a knife.

Transparency: Minerals may be transparent, sub-transparent, translucent, sub-translucent, opaque.

Taste: Minerals may be salty, sweet, bitter, etc.

Odor: This test is not of much use with most minerals until heat is applied.

Chemical composition: This may always be determined by suitable tests with re-agents.

Pyrognostic characters as a means of readily determining the nature of a specimen, the blow pipe is unrivaled, if in the hands of one who understands it.

Mode of occurrence and associated minerals: A knowledge of these matters often assists in a determination.

Gold is practically the metal most prospectors seek. It is very valuable and constitutes so very small a percentage of any ore that care must be taken or it may escape detection and be lost.

Panning is the miner's method. He crushes his ore thoroughly and places it in the pan with water; then, with a motion easy to learn but hard to describe, he swirls the water around, allowing a little of it to escape at each revolution carrying with it the lighter material until finally he has a little black sand and perhaps a few grains of yellow sub-

stance, which is gold. There are many things that look like gold to the novice, but gold will beat out thin under the hammer just as lead would, while most other substances resembling gold will crush to a powder under the hammer. Pure gold is soft and the point of the knife will scratch it deeply. Gold may be distinguished from all other metals by the three following tests: It is yellow; it may be flattened with the hammer; it is not acted upon by nitric acid.

The veins from which the gold of the world is won do not, on the average, hold the precious metal in greater proportions than one part of gold in 70,000 parts of vein matter. Under favorable conditions a proportion not one-fifth as rich as this may yield a rich return. Copper is a very easy mineral to test for. First crush the ore and dissolve it in nitric acid by heating, then dilute with some water and add ammonia; the solution should turn dark blue. The carbonate ores of copper do not extend deep in the mine, their places are taken by copper pyrites. Sulphide ores are usually difficult to treat and when they are to be tested it is better to roast them before trying the test for color.

Coal: Coal is often more valuable than gold, and the prospector should be prepared to estimate the value of any deposit he may come across during his travels. The following is a very rough but very effective test for coal:

Take a clay pipe, pulverize your sample, weight of twenty pennyweights, and place it in the bowl of the pipe, make a cover with some damp clay. Dry thoroughly and put the

bowl upside down over a flame. The gas in the coal will come out through the stem and may be lit with a match. Let the pipe cool after the gas has all escaped, break off the cover of the clay, and if the coal was adapted for coke, the result will be a lump of that substance in the bowl. Weigh this. The difference in weight between the coke and the twenty pennyweights of coal that were placed in the bowl will represent the combustible matter forced out by the heat. Now take this coke and burn it on a porcelain dish over a lamp. You will have more or less ash left and the difference in weight of the ash and the coke will be the amount of fixed carbon in the coal.

Your test is complete, and it need not have cost you even the pipe. Sulphur is a detriment to coal and if you notice much of it in the escaping fumes, you may be sure your sample is not worth much.

Mercury Cinnabar.

The common ore of mercury is a sulphide. Scratch it with a knife and the streak will be a bright crimson. Dissolve the ore in nitric acid; add a solution of caustic potash, and you have a yellow precipitate. Another test is to place the ore pulverized in a glass tube with some chloride of lime; close the top of the tube and place a smaller one therein, so bent that it will pass into a basin of water. Heat the bottom of the tube containing the ore and lime, keeping the upper part and the small tube cold with a wet rag and you will have a deposit of quicksilver in the basin.

Silver.

Silver ore may be detected by dissolving a small quantity in a test tube with a few drops of Nitric Acid. Boil until all red fumes disappear. Let the solution cool; add a little water. Filter the whole and add a few drops of Muriatic Acid, which will precipitate the white.

Chloride of Silver.

Dissolve this precipitate with ammonia; then add nitric acid once more. Exposed to the light, the precipitate soon shows a violet tint. Pure silver is the brightest of metals, of a brilliant white hue with rich lustre. To detect chloride of silver in a pulp, rub harshly with a clean, bright and wet copper cartridge, or coin, and if there be silver in the pulp, the copper will be coated with it. Graphite will also whiten copper but the film is easily rubbed off.

Nickel.

Nickel may be determined as follows: A little of the powdered ore taken up on the point of a pen knife and dissolved in a mixture of ten drops of nitric acid and five drops of muriatic acid, should be boiled over a lamp for a few minutes and ten drops of water added. A small quantity of Ferro-cyanide of potash will throw down a whitish-green precipitate, indicating nickel.

Platinum.

Platinum is a most refractory metal to treat, as it must be boiled for at least two hours in a mixture of muriatic acid

and nitric acid, known as Aqua Regia. A small amount of alcohol is to be added to the solution, and the latter filtered. The platinum is precipitated with ammonia chloride.

Manganese.

Manganese may be proved as follows: A few grains of powdered ore are placed in a test tube with three or four drops of sulphuric acid, two or three grains of granulated lead or litherage being dropped in. The color will become pink should manganese be in the ore.

A preliminary examination of a mineral may be made with a pocket mineral glass and pen knife. With the first, any conspicuous constituent may be recognized, while a scratch with the point of the pen knife, will give an idea of the softness or hardness of the mineral.

The next test should be with some ore powdered and held over a spirit lamp flame.

A few drops of water and a drop of sulpho-cyanide of potash will detect iron, should such metal be present, by a deep red color.

To another portion add one drop of hydrochloric acid and a dense curdy precipitate will prove silver, if it contains this metal.

Added to the same original nitric acid solution, a few drops of ammonia water would reveal copper by a blue color.

Antimony, Tin, Aluminum, Zinc, Cobalt and Nickel, Uranium and Titanium are best shown by the blow-pipe test.

When the prospector wishes to know all the constituents of an ore, he must analyze it. Not having a thorough knowledge of chemistry, he should send the sample of ore he wishes to know the contents of, to a reliable analytical chemist or assayer.

BLOW-PIPE TESTS.

As a means of readily detecting the presence of minerals in their ores, the Blow-Pipe, in the hands of a skillful operator, is unrivaled. Nor is this skill hard to come by; one or two weeks patient study under a good teacher should teach a great deal and subsequently proficiency would come by practice in the field.

The chemical blow-pipe is made of brass or german silver with platinum tip. The best fuel, taking everything into consideration, is a paraffine candle in cold climate, and a stearine candle in hot climate. Tallow may do in an emergency but it requires too much snuffing.

The blow-pipe can produce two flames; the one known as the reducing flame and the oxidizing flame. In the first, the substance under examination is heated out of contact with the air and parts with its oxygen. In the second, it is heated in the air and absorbs oxygen.

Well burnt pine or willow charcoal in slabs three inches by two inches is the material upon which the mineral to be tested is placed. A small, shallow depression is scraped out of one side of it and the assay placed therein.

Platinum wire, some three inches long, conveniently fused

into a piece of glass tube as a handle, is used to test the coloration of mineral in the flame. This should be cleaned occasionally in dilute sulphuric acid and then washed in water.

A small pair of forceps with platinum tips serve a great variety of purposes, but the beginner must be careful not to heat metallic substances in them to a red heat, as he may thereby cause an alloy of the metal with the platinum and spoil them for future use.

Glass tubing, one-quarter of an inch in diameter and about six inches in length, is used for various purposes. From this tubing, what are known as closed tubes, may be made by heating one end of the tubing by holding it over a lamp, and when it becomes fused, closing the end by means of pressure of some kind. The closed tubes are used in heating material out of contact with the air.

A small agate mortar is indispensable. It must be used for grinding substances of less hardness than itself to a powder, but it will break easily if struck a sharp blow.

A very small hammer is used to flatten metallic globules upon some hard surface, for instance any piece of iron or steel.

A magnet will detect the presence of any magnetic mineral, especially if it is reduced to powder and the test made under water.

A good mineral glass you must have.

A dozen test tubes of hard glass with stand, in small and medium sizes.

A glass funnel about 2½ inches in diameter is required in filtering. The circular filter papers are folded in four and placed in the funnel, point down, three thicknesses of the paper being on one side of the funnel and one on the other.

A wash bottle is made from a flask into which a sound cork has been placed with holes in it for two pieces of glass tubing. One serves as a mouthpiece into which the operator blows, while the other, reaching almost to the bottom of the bottle and ending in a spout outside of the cork, permits a stream of water to be forced out of the bottle when it is blown into.

A few glass rods in short lengths will do for stirrers.

A little ingenuity is better than much apparatus.

Of re-agents, the rough and ready prospector can get along with the following: Carbonate of soda, borax, microcosmic salts, cobalt solution, cyanide of potassium, granulated lead, bone ash, test papers of blue litmus and turmeric, the former for proving the presence of acid in a solution and the latter that of alkali.

The foregoing are all dry re-agents. The following are wet re-agents: Water, clean rain water, melted snow or distilled, Hydrochloric Acid, Sulphuric Acid, Nitric Acid, Ammonia, Nitrate of Cobalt.

Heating a mineral with carbonate of soda on charcoal is done as follows: The pulverized mineral, mixed with three times its bulk of carbonate of soda, is placed in the cavity of the charcoal. Tin ore, which is very difficult to reduce, should have a small amount of cyanide of potassium placed upon it after it has been heated for a few seconds and the flame is then reapplied. A globule of metal should then result and perhaps an incrustation on the coal. The reaction is as follows: Gold, yellow, malleable; silver, white, malleable; copper, red, malleable; lead, white, malleable; bismuth, white, brittle; antimony, white, brittle, fumes white.

A small loop is made of platinum wire and it is heated and dipped in borax, heated again, then touched while hot to the powdered mineral and heated once more. The following colors are obtained:

Iron will be red or yellow, hot, yellow, or colorless, cold.

Cobalt—Blue, hot or cold.

Copper—Green, hot; blue, cold.

Chronium—Green.

Nickel—Violet, hot; red brown, cold.

The mineral to be tested is generally powdered and moistened, placed in the cavity of the charcoal and covered or not as the circumstances may demand, with a small quantity of carbonate of soda. The following results may be obtained:

Antimony—Place the mineral in the cavity of the charcoal

with a pinch of carbonate of soda and blow upon it with the inner or oxidizing flame. This is formed by inserting the blow-pipe an eighth of an inch into the flame and blowing steadily. A white incrustation on the coal and a brittle button of antimony should result.

Lead—Treat the ore in the same way and you will get a yellow incrustation on the coal, and a malleable button of lead.

Zinc—Proceed as stated and after blowing for a few seconds, moisten the incrustations with a drop of nitrate of cobalt, heat once more but this time use the outer or reducing flame, produced in this way, keeping the point of the blow-pipe a little outside the flame and blowing more gently than before, so that the whole flame playing upon the coal may be yellow in color. A green incrustation will indicate zinc.

Copper—As usual, mix the ore and soda into a paste and fuse it with the oxidizing flame. Dig the mass out of the charcoal with the point of a knife and rub it in the mortar with water. If there was copper in the ore, red scales will be found in the test tube.

Arsenic—Heat in the inner flame for a second or two and if the sample contains arsenic, you will notice an odor of garlic.

Tin—This is a very difficult ore to reduce, but the addition of a little cyanide of potassium to the powdered ore will

make it easier. Fuse, after moistening on the charcoal in the oxidizing flame and you will get a small button of tin.

Silver—Make a paste of the ore with carbonate of soda; add a small piece of lead and fuse into a button; make a paste of bone ash and water and after you have dried it with a gentle flame, place the button of silver and lead on the bone ash and turn on the oxidizing flame. The lead will disappear, leaving a silver button. Should it not be pure white, but more or less tinged with yellow, it very likely contains gold; and if the button be dissolved in nitric acid, whatever remains behind will be gold.

Bismuth ores are very heavy. Usually they have more or less antimony associated with them, which is a detriment, as the separation is an expensive affair and the returns are less than they would be from a low grade, pure ore. In testing this metal, dissolve a crushed sample in nitric acid and then add potash in excess. If the ore contains bismuth, you should have a white precipitate; if it contains cobalt, you should get a bluish, green color.

Galena is often taken for other ores. If the ore be crushed and heated in nitric acid until dissolved, some water added and an addition made to the solution of a few drops of ferrocyanide of potassium, a dark red precipitate is the result.

If Lead ore be dissolved in nitric acid, the solution diluted and some hydrochloric acid added, a white precipitate is the result. Add ammonia and the precipitate remains unchanged.

The blow-pipe operator has to learn to breathe and blow at the same time. The breathing, he does through his nostrils; the blowing by the natural tendency of the cheeks to collapse when distended with air.

To identify Cinnabar, the ore from which quicksilver is obtained, make a paste of the sample in powdered form and carbonate of soda. Heat in the open tube and a globule of mercury will result.

Sulphur turns silver black. Make a paste with carbonate of soda, heat on the charcoal, and removing the mass with the point of a knife, lay it on a silver coin and moisten, a black sulphite of silver should show quickly on the coin, if sulphur is present. Magnesia gives a faint pink color when heated and treated with nitrate of cobalt on charcoal.

Alumina under the same treatment gives a blue color.

Roasting is an oxidizing process, the substance being heated in the air, so that it may absorb oxygen.

COUNTRY ROCK RULES.

Crystalline rocks are the most favorable for ore deposits but contacts of igneous with sedimentary rocks are also favorable for rich ores.

Intrusive Volcanic Rocks, that tip up formations nearly vertical, are most frequently associated with well mineralized veins.

Porphyry Rocks in or adjacent to veins, constitute a favorable condition for rich ores.

Quartz porphyries are generally associated with extensive copper deposits.

The nearer a vein approaches a vertical position, especially above the water level, the more valuable the ore is likely to be.

Ore generally arranges itself into bunches to conform with the cleavage and dip of the enclosing wall.

Ore bodies in a parallel vein generally occur in cross zones; ore opposite ore, and barren ground opposite barren ground.

Ore is usually richer in the most narrow and pinched places in the vein and lower grade ore in the wider portions.

Higher grade ore occurs at the intersection of a dyke or another vein, with a mineralized vein.

Enlarged bodies of ore generally occur in a fissure vein where is passes from one class of rock to another.

Gold ores, as a rule, are more valuable in the oxided zone and frequently decrease in ton value below the water level.

Gold ores, with values largely in pyrites, seldom yield values after pyrites change to white iron.

Ore enrichments usually occur when a vein changes in dip or strike, but this often gives way to lean ore bodies below the point of enrichment.

A heavy iron capping or gossen at the vein outcrop, indicates extensive sulphide ore bodies in depth.

Oxides and carbonates of lead and copper, resulting from the decomposition of sulphides of those minerals, never continue below the natural water level, where they change to sulphides.

Local enrichments of oxides and carbonate minerals result from leaching of ore above, whose metallic elements are precipitated below.

Deposits of mercury ore or cinnabar rarely occur in paying quantities except in porous, serpentine or sandstone rocks, which have been faulted by intrusion of igneous rock.

Intrusions of porphyry or quartz-porphyry when occurring in or near a vein are favorable conditions of valuable ore deposits.

CAMP LIFE AND HEALTH.

A camp kit of cooking utensils often begins and ends with a frying pan, stew pot and small coffee pot. With them, all things are possible in preparing all kinds of food.

All provisions should be kept in canvas bags, matches in a leather case or safe, or in a corked bottle or tin can.

The existence of the prospector being passed in regions where the so-called benefits of civilization have not penetrated, is generally a happy, hopeful one, especially hopeful. I do not ever remember meeting one that was not brimful of enthusiasm and hopeful for the future. No doubt prospectors who have become pessimistic drop out of the ranks. The man who elects to dwell with nature has only himself to blame if he does not like his lodgings. He can

be comfortable or miserable, according to his knowledge of taking advantage of his natural surroundings.

Whereas the novice starts out with the avowed intention of "roughing it", the veteran camper is particularly careful to take things as easy as possible for him, being assured that in any case there will be enough trouble unavoidable, to satisfy any reasonable craving for roughing it. The prospector learns by experience to look after his own comfort and sieze every opportunity to make his life as comfortable as possible.

The three prime wants are food, clothing and shelter. Food is very scarce in many parts of the world, and one of the great problems in isolated travel is to provide transportation for supplies that must be carried from civilization. A cold climate will necessitate a large consumption of strong, heat-producing food. On the contrary, in warm or tropical climates, to eat a light diet of cereals and lean meat and plenty of boiled water.

In the United States, the working man found out long ago that pork and beans suit him nicely. It "sticks to the ribs." Meaning, the prospector can walk longer on pork and beans than on almost any other food. The man of science, after a couple of hundred years or so of investigation, confirms the fact by announcing the flesh of a swine mixed with the fruit of the bean, contains all the carbo-hydrate, etc., necessary to sustain life. The moral of all of this is, that pork and beans must not be forgotten when outfitting. A few other

things being desirable, the following list may be consulted by the prospector or camper: Sugar, evaporated apples, salt pork or bacon, pepper, condensed milk, flour, a few candles, matches, soap, tea, and beans.

The favorable style of shelter for the confirmed camper or prospector is the dugout. The beauty of the dugout is its simplicity. A hole in the side of a bank, a few logs for roof and you have a shelter that is almost perfect.

A veteran miner goes to earth as easily as a rabbit and, like the bunny, is never at a loss for habitation.

If overtaken by a storm in the wilds, do as the wild animals do under like circumstances; seek the nearest shelter and lie close until the storm has abated. The secret is to conserve your energy, not to fritter it away fighting a power over which you have no control. A shallow, brush lined gulch, the lea side of a bank or small clump of trees—these and other seemingly slight protections sometimes mean a lot of protection for you in case of severe storm.

A tent should never be pitched loosely, as no matter how fine the weather when you pitch it, in a few hours it may be temptuous in the extreme and the unpleasantness of having a tent come down on one's head in the dark must be experienced to be realized.

Prospectors, miners and campers as a rule are a healthy, hardy lot, but nevertheless they are occasionally taken ill and there is seldom a doctor near at hand.

Should poison have been swallowed, an emetic should be given as quickly as possible. Mustard or salt and warm water, are very effective, but a dose of sixty grains of ipecac is more effectual. While the emetic is acting, the patient should drink freely of warm water or milk.

In case of a wound which bleeds profusely, a distinction must be made between blood issuing from a vein and blood issuing from an artery. In the first instance, it will be nearly black or at least very dark; in the second, it will be bright red and spurt forth. When from a vein, bleeding must be controlled by pressure below the wound, that is father away from the heart, while in the case of an artery, which is always more dangerous, immediate pressure must be made above the wound on the line of the artery, between the wound and the heart. A small pebble rolled up in a handkerchief and tied around the limb, with the stone directly above the artery and tightened by twisting a stick in it, is a good rough and ready means to stop bleeding. Sometimes a pad should be placed between the handkerchief and the artery. If you get a burn, anything that excludes air, such as wheat flour, olive oil, boiled linseed oil or grated raw potato is good to spread over a burn. If any considerable surface is burned, the patient is in great danger, but small burns are not fatal, although they may be very painful. The best application of all is linseed oil and lime water.

Scurvy is a disease to be dreaded whenever fresh meat and vegetables are scarce. It is now thought to be a condition of acid poisoning and the remedy is alkaline salts, such as

carbonate of soda or carbonate of potash. Lime juice is also an antidote. In cold weather, a diet of almost fresh meats will ward off scurvy.

Pneumonia is usually most fatal in crowded camps, where the men do not get a sufficient amount of pure air, so live in the open and breathe all the fresh air that nature intended you should have.

The prospector will find it useful to make up a small case of medicine. This should contain a box of pills, a box of carbolic salve, some court plaster, a package of pure medicated soap of some kind, and some crystals of permanganate of potash, to be used in case of rattlesnake bite, as most all mining regions are infested with these deadly, poisonous reptiles and one is liable to become a victim any time, especially during the warm months. This permanganate of potash should be used in this way—the crystals should be dissolved in water and the solution must be injected in and around the wound with a hypodermic syringe, immediately after being bitten, as delay is dangerous. It is well to have a small vial of the solution made up and keep it on your person for immediate use. This remedy used in time, is a certain antidote for snake poison.

Working The Claim

A prospector for minerals is a seeker for wealth. Therefore as a general rule, he has no funds, except sufficient for a grub take. This means, just enough, and sometimes scant, to bear his provision bill and his traveling expense. Therefore he is not able to do extensive work on a mineral claim, which always means heavy expense.

The instructions of the working of a great mine is too complex to state here. The beginner must learn this by experience. The object of this work is to instruct him in the preliminary work.

First, upon finding a mineral claim, you should determine its merits by advice and method of tests previously given. If it stands the test of a good prospect, you should locate it as described above. Diligently explore the surface croppings of the vein and sink your discovery shaft on the most favorable place on the vein; that is, the richest ore chute you can find. Get on your ore with the work and always stay with your ore. Sometimes your ore will dip one way, sometimes another, but the prospector, being short of funds, cannot afford to go blindly, digging around in hard rock, as it is very expensive and his main object is to show his prospect to such an advantage that he can find a purchaser.

After sinking your discovery or development shaft as far down as you can throw the material from the bottom, which

is about ten feet, then you will put on a windlass with rope and bucket. The bucket will consist of any receptacle you may have on hand, but should not exceed the capacity of seventy-five pounds of material, as when you attempt to hoist and handle a greater weight than this, it becomes a very trying affair. The windlass is not adapted for handling material over fifty feet in depth. If the prospector and miner desires to go deeper than fifty feet and is short of funds, the horse whim is the next most economical and you will be able to go as far as two hundred and fifty feet in the most economical manner. After this depth you will require a power hoist. But very few prospectors attain to such depths as stated before. The prospector's mission is to discover the mineral and sell it to advantage to men with capital sufficient to develop the mineral prospect to a paying basis.

Farther on I will tell you how to reap the most benefit financially out of your prospect, in the chapter entitled "The Business Part of Mining."

The Business Part of Mining

The general public conception of mining is a fake pure and simple. This is urged on by most all literature that is written on the subject being subsidized by other channels of investments, which is a fallacy, because, if minerals and metals could not be produced at a profit, our present system of civilization would come to a stand-still. We would have no gold, no silver, no iron, no steel. You would not even have knives, forks and spoons to eat with, nor coal to warm you in winter.

The prospector's mission is to discover and by his efforts to bring into production for the benefit of the general public, the essential minerals and metals that our complex civilization demands, and he is entitled to a reward commensurate with this service to the welfare of the general public, and I will herewith give some hints for his benefit.

The Author of this book was known all over the Pacific Coast as a successful prospector, for the reason that he could pay his way and never ask help. The reason of this was the policy or business part of mining from the prospector's point of view, looked at with a practical view-point.

First, if you find a mineral prospect, even if it looks good, and you cannot make it pay with the financial resources at your command, whatever price you can sell it for, to a possi-

ble purchaser on the road, while the prospect may turn out millions in value, it would do you no good without the proper capital to finance it to a paying basis and there is no use to fritter your life away, wailing for someone to come along and give you a tremendous sum of money for a mere prospect, where it is not developed to the extent of a mine, because the investor, as a general rule, is a cold blooded proposition. There are too many folks with gold, silver and mineral claims for sale, but those you can sell at a speculative value, the investor is taking a chance of loss where your claim is not developed to the extent of a mine, and it is to your interest to at least divide the chance with him.

The greatest chance of loss is not in buying the mine, but in future development work and equipment, which the investor has to take on a mere prospect of mineral, so play fair. One good way is to retain a small non-assessable interest and let the capital bear the expense. If the prospect makes good, you will no doubt make more money out of it than if you sold for a nominal sum of cash, but if this arrangement cannot be made when a bona fide deal comes up, the advice is to sell anyway, when your claim is not developed into a mine.

The superfiicial prospector for minerals seldom meets with success. It is the deliberate, patient, delving, analytical prospector who plucks the plums. Running about is not prospecting. Prospecting is getting down to the root of things and seeking diligently for his fortune.

Another mistake to which the prospector is liable is self

deception. He wants to find rich deposits of mineral. When he does find a lode or placer containing mineral, he is quite apt to let his desire influence his estimate of the value therein. However much satisfaction this may afford him at the time, it only leads to future loss and disappointment. He should be very judicial and impartial in forming his conclusions on the values.

Another great mistake more frequently made is the attempting to locate too many claims. The average prospector is a poor speculator. The prospector must remember that to hold a claim or make his location valid, he must operate it and improve it; if it is not a good claim it is not worth the work that is required to hold it under the Mining Laws of the United States and the Federal Statutes. If it is a good claim, he better put in his time developing it rather than to put in his time locating other claims, especially where the law requires you to do discovery work.

One other mistake may be referred to here, and that is carelessness in making his locations and proofs. If a claim proves to be a particularly valuable one, there are plenty of unscrupulous persons who are ready to take advantage of any slip, oversight or technical negligence on the part of the discoverer, and who may file contesting claims and attempt to deprive him of the property. Even if they should not succeed in their efforts, it is expensive and unpleasant to have to litigate over a claim. Great care should be taken in marking out a claim, setting substantial posts or monuments, posting all required notices in a proper manner and

fulfilling every demand of the law, in order to have no grounds for litigation.

It is advisable for the prospector before locating a claim to inform himself of the law, which he can do by purchasing some Book on Mining Laws, which are authority on this line of work.

Many mistaken notions prevail in regards to mining in general and ore deposits in particular, and it will no doubt prove of interest, if not profit, to refer to some of them. They may be grouped into two classes. Mistakes due to ignorance and inexperience and mistakes due to experience with bad judgment. Mistakes due to ignorance and inexperience are to be expected, but they may be prevented by mining knowledge and practical mining experience, so it may not be amiss to notice the most prominent.

Many hard-headed business men, who have succeeded in commercial lines, assume they can be equally successful in mining without any knowledge whatever of the science of mining. Others regard mining as a mere chance, but the mission of this book will have failed if any reader falls into such fatal errors. An equally grievous error of the unlearned and inexperienced is to disregard all geological formation and adopt the slogan that "Gold is where you find it," and to assume that you are apt to find a gold mine in digging a well or driving a water tunnel as anywhere else.

A common saying amongst the inexperienced is that one man can see as deep into the ground as another; in other

words, that the novice in mining knows as much what is below, as the Mining Engineer. So far as the physical eye is concerned, one man's sight may be as good as another, but the scientific eye can penetrate solid rocks and often see more than the untrained eye can see after a shaft has been sunk.

Many who are ignorant of vein formation and the principal underlying ore deposits, jump at the conclusion that a mining claim adjoining a rich mine will prove equally valuable. Such a thing does now and then happen, but it will not do to act on such a supposition.

It must not be thought that experience will always guard against errors. Experience is a good teacher but many fail to learn with the best of teachers and go on making the same mistakes over and over again. However, wisdom and experience amalgamated make a safe guide and will prevent the errors which are all too common in mining operations.

A common error is for a miner to judge every mining district by his experience in a particular field and it frequently happens that a prospector removing to a new country utterly fails because he expects to find rock formation and ore deposits like those of the district he has left.

The practical mining man should be conservative. Form opinions he must, as all will who use their reasoning powers, but definite conclusions and fixed opinions should not be formed except on strong evidence and corroborative proofs.

Miscellaneous

Miner's Inch.

A Miner's inch of water varies in different states and is therefore not a fixed quantity. In some states it means the quantity of water that will flow through an orifice one inch square on the bottom side of a box under a pressure of four inches. Under these conditions a miner's inch will discharge 2,259 cubic feet, or 17,648 gallons every twenty-four hours, which is at the rate of twelve gallons a minute.

In calculating the amount of water required by a stamp mill it is usual to allow 74 gallons for each stamp, 120 gallons for every pan, 75 gallons for every settler, 120 gallons for each concentrator, 350 gallons for a jig and 8 gallons for every horsepower each hour.

Lumber in a Log.

Multiply the diameter in inches at the small end by one half the number of inches; again multiply this product by the length of the log in feet. This product divided by twelve will give the number of feet of one-inch boards the log will make.

Horse Power of Boilers.

For horizontal, tubular and flue boilers, divide the number of feet of heating surface by 15. This will give the horse power.

Horse Power of an Engine.

Multiply the area of the cylinder in square inches by the average effective pressure in pounds to the square inch, deducting 3 pounds to the square inch for friction. Multiply this remainder by the speed of the piston in feet per minute and divide by 33.000, the quotient will be the true horse power.

Horse Power of Pelton Wheel.

The Pelton wheel is in high favor with California miners when the head water is known in feet. Multiply by 0.0024147 and the product is the horse power that one miner's inch of water will give.

A Cheap Testing Outfit.

Sometimes the pioneer is forced to attempt a good many investigations with very simple apparatus. Should he possess the following, he can achieve much. A spirit lamp, candle, blow-pipe, magnet, a bottle of hydrochloric acid, quart glass jar, three test tubes with corks, two feet of glass tubing, copper wire, two square inches of tin plate, forceps and test papers. Such an outfit will not cost very much.

Weight of Sand, Earth, Gravel, Etc.

A ton of pit sand averages 23 cubic feet.
21 cubic feet makes a ton of earth.
19 cubic feet makes a ton of coarse gravel.
18 cubic feet makes a ton of clay.
A ton of chalk will average 14 cubic feet.

Weights of Ores and Rocks.

Quartz will average 162 pounds to the cubic foot.
Silver Glance—455 pounds.
Ruby Silver—362.
Brittle Silver—386.
Horn Silver—345.
Antimony Glance—287.
Cinnabar—549.
Copper Pyrites—262.
Gray Copper—280.
Galena—461.
Zinc Blend—249.
Iron Pyrites—312.
Limestone—174.
Clay—162.

Hydraulic Data.

An imperial gallon of water weighs ten pounds.
Gallons multiplied by 1606 equals cubic feet.
Cubic feet multiplied by 6.288 equals gallons.
Gallons multiplied by 277.46 equals inches.
Cubic inches multiplied by 0.004464 equals tons.
Tons multiplied by 224 equals gallons.
Tons multiplied by 35.97 equals cubic feet.

To Calculate Weight of Ores.

Measure the contents of the mass. Multiply this by the weight of one cubic foot of the mineral as stated previously.

Weights and Measures.

Troy Weight—24 grains, one pennyweight.
20 pennyweights—one ounce.
12 ounces—one pound.

Long Measure.

12 inches—one foot.
3 feet—one yard.
2 yards—one fathom.
16½ feet—one rod.
4 rods—one chain.
10 chains—one furlong.
8 furlongs—one mile.

Square Measure.

9 square feet—one square yard.
30½ square yards—one square rod.
4 square rods—one square acre.
640 square acres—one square mile.

Land Measure.

7.92 inches—one link.
25 links—one rod.
4 rods—one chain.
80 chains—one mile.

Avoirdupois Weight.

16 drachms—one ounce.
16 ounces—one pound.
25 pounds—one quarter.
4 quarters—one hundred weight.
20 hundred weight—one ton.

Apothecary's Weight.

20 grains—one scruple.
3 scruples—one dram.
8 drams—one ounce.
12 ounces—one pound.

Mining Regulations.

The Mining Regulations of every country differ and the prospector must learn by heart provisions of the one he works under.

Pocket Hunting.

This term is derived from a class of prospectors who specialize in prospecting for pockets of gold and they are called Pocket Hunters.

After the placer fields of northern California were stripped of the richest values in channels and bars, and were too lean for the miner to work on a small scale, this condition impelled the miners to look for the source of the placer gold. Consequently, in many favorable fields, they found pockets of gold, some with only a few hundred dollars and some with a fortune in them. Many failed to find any pocket and soon dropped out of the ranks of this class of prospectors. As usual, the efficient and observing prospector made more or less of a success in this line of hunting for pockets, because he had studied the method of prospecting for pockets of gold so thoroughly that it became an exact science with him, and once let him get on the trail of a color of gold and he would trace it to its source. Just like you would follow

the hoof prints of a horse on the ground until you came to the horse, only he used the miner's pan, pick and shovel. Sometimes, after digging, panning and tracing for days and sometimes weeks, he would come to the end of the trail only to find that the pocket he had been tracing had been entirely eroded and scattered through the soil and gravel.

Then again at the end of the trail he might uncover a partially eroded pocket and obtain good pay for his persistent work and again if he was what they called lucky he would uncover a pocket just exposed to disintegration sufficient to throw out the trace. When he was fortunate enough to make this kind of discovery, it was generally sufficient for him to retire from his arduous work.

The method of prospecting for pockets is like this: Seek your gold placer field, and determine if the source of the gold therein is local; that is, has it come from the higher ground immediately adjoining.

This can be determined in this way. If the particles of gold you obtain in your pan are rough and not worn smooth and there is no foreign drift material in the gravel, that is, there will be appreciable quantity of material in the gravel that cannot be duplicated in the surrounding formation, then you can be certain the placer gold has a local origin.

After you determine this, it is natural you should wish to find the source from whence this gold came.

The method in tracing this source is like this. Select a gulch or creek you know carries gold. Begin panning as

far up as you surmise the gold values extend. Continue panning until you are unable to obtain a color of gold. Then try each side of the rising ground until you obtain color of gold. Once on the trail, continue panning in every direction until you cease to obtain color.

Then begin to dig and look for the pocket or source of the gold. This method is the most exact way to determine the source of any local placer gold. It requires persistent, patient work to be taken up day after day at the point where you left off the day before, but the reward may be great. In any event, it is worth the trouble and work. If you are successful in locating a rich deposit of gold, your financial troubles are over, temporarily at least, and if you fail, try another point and go through the same method of tracing, never forgetting that persistence, work and intelligence will win.

Dynamite.

Dynamite should be stored in a magazine which must be dry, cool and well ventilated. Bricks are best, but when built of wood, the frame should be covered inside and out with boards, allowing the air to have free circulation between the walls, so that the inner wall may not be heated by the sun.

Do not store your caps with the dynamite.

If powder was well made, it is as good a dozen years afterwards as it was the day it came from the factory.

Most accidents occur in thawing dynamite. Dynamite freezes between 40 and 45 degrees F. That is ten degrees above the freezing point of water, and although it does not explode, if heated slowly, until 320 degrees F. is reached, yet the quick application of dry heat may explode it at 120 degrees F. This makes it dangerous, for a stick of powder hot enough to explode under certain conditions may be held in the hand with little inconvenience. Powder should be thawed by placing it in water tight vessels and the vessel set in hot water. It should never be placed on or under a stove or in an oven or on a boiler wall to thaw out, as is so often done by the unthinking. Frozen dynamite is especially liable to explode from heat quickly applied.

Frozen powder is unfit for use. It will burn or smoulder and some of it may be left in the drill hole to explode when it is not wanted to.

Where To Go To Explore For Minerals

The question, where to go to explore, depends largely upon the prospector. If he be a general seeker after mineral wealth, and is prepared by education and equipment to recognize the various minerals, stones and gems and determine their value, then the world is his field, for there are few areas of great extent which do not contain valuable mineral of some kind. If he has but two or three minerals in view, or is qualified to judge of a limited number, then he best seek those regions known to contain those minerals.

There are certain strips of country known to contain certain minerals, to which the term belt has been applied. Thus we have our Gold Belts, Silver Belts, Copper Belts, Coal Belts and Oil Belts. There are belts or areas in which precious and semi-precious gems are found and certain other treasures of the earth are so located as to come within the definition of Mineral Belts. While discoveries of metals, minerals and gems are frequently made in entirely new fields, it is in the prospecting of the territory within the known districts or belts that the prospector's best chances for success lie.

A little general knowledge of the character of rocks will prove of great value to the prospector. For example, he should be able to distinguish between Igneous Rocks and

Aqueous Rocks, as very different classes of minerals are common to each. Aqueous rocks are water formed, igneous are fire formed. One need never look for coal, for example, in igneous or volcanic rocks. On the other hand, metaliferous veins are not to be sought in Aqueous formations.

Certain minerals and groups of minerals are associated with certain kinds of rock. Gold is most commonly found in quartz, though there is scarcely a kind of rock known in which gold is not sometimes found.

The minerals most commonly associated with lime stone are zinc and lead. In a hornblend formation one may expect chrome iron, asbestos, soapstone, gold, silver and copper. In shale he may look for fire clay, coal, rock salt and gypsum.

In granite, the precious metals mostly occur such as tin and its allied metals, molybdinum, gold, silver, etc.

The volcanic regions offer a field for the gem prospector, also the precious metals, sulphur and a variety of minerals.

Ancient lake beds in the hot and barren desert regions are the natural depositories of soluble minerals such as nitre, borax, soda and the like.

Glossary

While there are not many technical terms used in this book, it is well for the prospector and miner to familiarize himself with the technical terms of mining and minerals, so we herewith print a list of definitions.

ABRASIVES.

Minerals or rock substances used in grinding, abrasing and polishing.

ACANTHITE.

A silver sulphide, containing 87 per cent silver.

AGATE.

A variegated chalcedony used as a gem, and in mechanical lines for meter and scale bearings, phonograph needles, dental tools, mortars and pestles and for ornaments.

ALABASTER.

Compact, fine grained gypsum, white or delicately shaded.

ALBITE.

Soda feldspar, a silicate of aluminum and sodium.

ALMANDITE.

A common garnet used very abundantly as an abrasive.

ALUMINUM.

A metallic element not found native, valuable for its light weight, universally used in all arts.

AMALGAM.

A native compound of gold, silver and mercury.

AMBER.

Fossil resin, used in pharmacy, the arts and as a gem.

AMETHYST.

A purple or bluish violet quartz used as a gem.

ANGLESITE.

Lead sulphate—contains 68 per cent lead.

ANTHRACITE.

A hard coal, a hard, black, lustrous coal containing 85 to 95 per cent carbon as against 70 to 85 per cent in bituminous or soft coal.

ANTIMONY.

An element sometimes found native. Used in babbit and other bearing metals, type metal, white metal and several other uses.

ARGENTITE.

Silver glance, a silver sulphide. Contains 87 per cent silver.

ASBESTOS.

A fibrous variety of amphibole. In commerce it includes also fibrous serpentine (chrysotile). The properties of asbestos, such as its non-combustibility, non-conductivity of heat and electricity and its fibrous structure, make it one of the most useful minerals for many structural purposes.

AZURITE.

Blue copper carbonate. Contains 46 per cent copper. Sometimes used as a gem; also used as a pigment.

BARITE.

Heavy spar, barium sulphate. Used principally as a pigment in mixed paints.

BASALT.

A dense to glossy, dark colored basic, volcanic rock, composed essentially of soda-lime, feldspar and pyroxene.

BAUXITE.

Hydrated alumnia. The chief uses of bauxite are as a raw material in the production of aluminum salts and in the manufacture of the metal aluminum.

BIOTITE.

A black or brown mica.

BISMUTH.

An element found as a native metal. The metal is used as a component part of cliche or low melting point metals and in solder.

BITUMEN.

A general name for various solid and semi-solid hydrocarbons.

BLOOD STONE.

A variety of chalsedony or jasper. Dark green in color, interspersed with small red spots.

BORAX.

Sodium tetraborate. Used in many trades; for enameling ironware, such as bath tubs, sinks and crockery, pottery and tile. Extensively used in industrial chemistry, medicine and household. As an antiseptic, for preserving food, in the manufacture of baking powder, flavoring extracts, soap, starch and glue.

BREA.

Semi-solid natural asphalt. Used as a flux, as a roofing material and in permanent construction.

CALAVERITE.

A telluride of gold and silver, variable in composition but contains about 39.5 per cent in gold and 3.1 per cent in silver.

CASSITERITE.

Tin oxide. The mineral from which all tin is obtained.

HORN SILVER.

Silver chloride; 75 per cent silver.

CHALCOCITE.

Copper glance. A copper sulphide. Contains 79.8 per cent copper.

CINNABAR.

A vermilion mercury sulphide; 86 per cent mercury. It is the common ore of mercury or quicksilver.

COBALT.

A metallic element not found native. Used in coloring glass and ceramic wares blue.

COLEMANITE.

A hydrous borate of calcium. The principal source of borax and boracic acid in the United States.

COPPER.

Sometimes found as native metal. Widely used in the different industries, chiefly for electric transmitters, in brass manufacture, in copper castings, such as in those for machinery and for household utensils. Has been used for coins since the earliest times.

CUPRITE.

Native red copper oxide. Contains 88.8 per cent copper.

DIABASE.

A basic igneous rock, usually occurring in dykes or intrusive sheets and composed essentially of plagioclase feldspar and augite, with small quantities of magnetite and apatite.

DIAMOND.

A very hard native crystallized form of carbon. When pure and clear, it is used for a gem.

DIATOMACEOUS EARTH.

An earthy substance or soft rock composed of the silceous skeletons of small aquatic plants called Diatoms, used chiefly in the manufacture of filters, abrasives and polishing powders. A polishing material for precious metal ware; an absorbent of liquid materials and for insulation. Used also for fire-proofing. It is placed on the market as a loose powder and also as cut or molded bricks.

DIORITE.

A granulated rock composed essentially of hornblend and feldspar, which is mostly or wholly plagioclase, with accessory biotite, and augite or nugite along. Minute grains of magnatite and titanite may be visible. Quartz may be present in considerable amount, in which case the rock is called Quartz Diorite.

DOLOMITE.

A carbonate of calcium magnesium or a rock composed mainly of that mineral with a natural or artificial admixture of clay. It is burned to form Rosendale Hydraulic Cement, for which purpose it should be low in iron and sulphur. It is used for many of the same purposes as ordinary limestone, burned and unburned. Dolomite is also used as a source of carbonic acid, for which purpose it is, if anything, more valuable than ordinary limestone. Large quantities are used as building stone.

ELECTRUM.

A natural alloy of gold and silver containing approximately 40 per cent of silver.

EMERALD.

A rich, green variety of beryl. Used as a gem.

EPIDOTE.

A basic or thosilicate of calcium, aluminum and iron. More or less conspicuous in several granites and related rocks, where it is a principal constituent of Unakite. It is used as a gem.

GALENA.

A lead sulphide. Contains 86.6 per cent lead. Is the principal lead ore mineral.

GNEISS.

A banded, metamorphic rock with a more or less developed cleavage, but without the fissility of schist. Used for the same purpose as granite.

GOLD.

Generally found as a native metal. Used in coinage (a Standard of Value), jewelry, the arts, drugs and in chemical and physical researches.

GRANITE.

A granular igneous rock, composed essentially of quartz, feldspar and mica.

GRANITE PORPHYRY.

A rock intermediate between granite and rhyolite or quartz porphyry, having the same mineral as granite but a porphyritic texture like quartz porphyry. Used for foundations and building stone.

GRAPHITE.

Plumbago, black lead. A soft, steel-gray to black, more or less impure, native form of carbon. The principal use is in making crucibles and other refractory products for the steel, brass, bronze and electro-chemical industries. Subsidiary uses are in the manufacture of stove polish, foundry facings, lead pencils, paint for metallic surfaces.

GUANO.

The earthy, hardened excreta of birds and bats in caves, sheltering rocks and other roosting places. Valuable as fertilizer for its phosphoric acid, ammonia and potash.

GYPSUM.

Hydrous calcium sulphate. Contains 32.5 per cent lime, 46.6 per cent sulphur trioxide, 20.9 per cent water. Alabaster is a fine grained compact variety. White, shaded or tinted.

Gypsum is an incoherent mass of very small gypsum crystals or particles and has a soft, earthy appearance. Contains various impurities, generally silica and clay. Satin spar is a fine fibrous variety, which has a pearly, opalescent appearance.

Selenite is a variety which occurs in distinct crystals or of broad folia.

Rock gypsum, the most common form and the principal source of gypsum, is a finely crystalline, white or pink to black deposit, occurring interbedded with other strata.

Used crude as an ingredient for Portland cement manufacture and land plaster. Used calcined for plaster of paris, wall plaster, for molding and casting, Keen's Cement, dental plaster and in bedding glass for polishing. While massive, gypsum or alabaster is used by sculptors for interior ornamentation, and it is carved into vases and other objects of art.

HEMATITE.

Gray iron ore, red iron ore, specular iron, oxide of iron. Contains 70 per cent iron. Is an important source of iron; is used also in the manufacture of cheap paints, as polishing powder and in a crushed form for ornamental work.

HUBNERITE.

Nearly pure manganese tungstate. When pure it contains 76.6 per cent tungsten trioxide. A source of tungsten, ferrostungsten and sodium tungstate.

IRON.

Rarely found native. By far the most common and most useful of all the metals. It occurs in abundance in nature in many forms (very rarely as the metal), being an important constituent of almost all rocks.

JADE.

A hard and extremely tough mineral of varying composition. Greenish white to deep green in color. Used in making carved ornaments and as a gem.

JASPER.

Red, brown, yellow, green. Impure slightly translucent, crypto crystatlline quartz with a dull fracture. Used as a gem and ornamental stone.

JET.

A dense, black lignite, taking good polish. Sometimes used for jewelry.

KAOLIN.

A clay, mainly hydrous aluminum silicate, from which porcelain, china, stoneware, fire brick, fancy tile and other products may be made.

LAVA.

A volcanic rock that has reached the surface of the earth while molten.

LEAD.

A metallic element rarely found native. Commercial lead is extremely pure. Used in most every line.

LIGNITE.

A brownish, black coal in which the alterations of vegetable material has proceeded farther than peat but not so far as in sub-bituminous coal.

LIMESTONE.

A rock composed mainly of calcium carbonate. Used for an infinite variety of purposes.

LITHOGRAPHIC STONE.

A fine grained homogeneous limestone, suitable for etching. Used for engraving in lithography.

MAGNESITE.

Magnesium carbonate. Used chiefly in the manufacture of wood-pulp for paper by the sulphite process. In the manufacture of oxy-chloride or sorel cement, magnesite cement or plaster, which is used for sanitary flooring, artificial

marble, tiles and as plastic or stucco for exterior finish. Used also in making carbon dioxide, refractory bricks and fire proof and damp proof paints and in the rubber industry.

MAGNESIUM.

A silver white metallic element used in the manufacture of shrapnel shells to produce light and smoke and in making copper castings, to prevent blow-holes by decomposing the gases found in the melting of the copper. It is now derived as a by-product from magnesium chloride.

MAGNETITE.

Magnetic iron ore. The magnetic iron oxide. Contains 72.4 per cent iron, the richest and purest ore of iron. Used largely for the production of the commercial metal and to some extent as a flux in lead and copper smelting.

MALACHITE.

Green basic copper carbonates. Contains 40.3 per cent copper. A source of copper and used also for inlay in ornamental work and sometimes as a gem. Used as a pigment in imitation bronze.

MANGANESE.

A metallic element. Occurs abundantly in nature. Chiefly as oxides. The chief uses of manganese may be classed as metallurgic in the manufacture of alloys and as fluxes in the reduction of copper, lead and silver ores and chemical, as an oxidizer and as a coloring material.

MARBLE.

Crystalline, granular limestone or Dolomite, generally susceptible of a high polish.

The Verde Antique marbles consist mostly of serpentine. Used as monumental, statuary, ornamental and building stone in exterior and interior work.

MERCURY OR QUICKSILVER.

Sometimes found native but mostly derived from the ore cinnabar, normally. By far the greatest part of the world's production of mercury is used in extracting gold and silver from their ores.

MICA.

A hydrous silicate of aluminum and an alkali as potassium, sodium or lithium, having a very fine basal cleavage which renders it capable of being split into thin, tough, transparent plates. The most common varieties are muscovite and biotite. Used in trade for stove windows, gas lamp chimneys, lamp shades and spectacles and as an insulating material in the manuacture of almost all kinds of electric machinery and apparatus.

MILLERITE.

Nickel sulphide contains 64.1 per cent nickel.

MOLYBDENUM.

A metallic element of wide but not abundant distribution. Used extensively in the manufacture of very hard steels and many other lines of manufacturing.

MUSCOVITE.

Potash bearing white mica.

NICKEL.

A metallic element chiefly used in making nickel steel. Great quantities of nickel are used in plating various metallic objects and smaller quantities, also used in making coins.

NITRE OR SALTPETER.

Potassium nitrate. Used in manufacturing nitric acid, gunpowder and other explosives, as a fertilizer and in curing meats.

OBSIDIAN.

Volcanic glass, extrusive igneous rocks which have cooled either without crystallization or with only partial crystallization. Used as a gem.

OCHRE.

Mineral paint. A metallic oxide occurring in an earthly or pulverulent form. Commercially the term ochre is used to mean the yellow, red and brown earthy iron oxides.

ORTHOCLASE.

The monoclinic potash feldspar. Contains a maximum of 16.9 per cent of potash. Sometimes used as a gem.

PEGMATITE.

Giant granite. An igneous rock, generally coarse grained but usually irregular in texture and composition. Composed mainly of silicate minerals of large size, including quartz, feldspar, muscovite, biotite, tourmaline, beryl, lithia min-

erals, etc. Some pegmatites carry minerals containing the rare earth metals, tin, tungsten, uranium and others.

PETZITE.

Telluride of silver and gold. The gold contents range from 18.2 to 25.6 per cent and the silver from 40.7 to 46.8 per cent.

PHOSPHATE ROCK.

A sedimentary rock containing phosphate of lime. The form in which the phosphate of lime occurs is obscure. Used in the manufacture of artificial fertilizer and chemicals containing phosphoric acid.

PLATINUM.

An element occurring as a native metal. Practically all platinum is found in the metallic state.

POLYBASITE.

Sulphide of silver. An antimony. If pure, it would contain 75.6 per cent silver but copper replaces part of the silver; also arsenic replaces antimony.

PORPHYRY.

An igneous rock in which relatively large, conspicuous crystals are set in a finer grained or glassy ground mass.

Porphyries are generally named in accordance with their rock composition (for example, granite porphyry). The word porphyry is used by miners to mean almost any kind of igneous rocks, particularly one that is spotted, soft or light colored.

POTASH.

The oxide of potassium. The potash of commerce is derived from the minerals carmolite, kainite, sylvite and nitre, and also from certain sea weeds, wood ashes and marls. The principal potash bearing silicate minerals are orthoclase, leucite, sanidine and muscovite.

PUMICE.

Highly vesicular or cellular, glassy lava or volcanic dust or ash, generally rhyolitic in composition. Used for abrasive work, chiefly for wood polishing and in the preparation of tooth powder and certain cleansing and scouring compounds.

PYRITE.

Iron pyrites crystallized, disulphide. Contains 46.6 per cent iron and 53.4 per cent sulphur. Used chiefly in making sulphuric acid. It is very widely distributed as a gangue mineral in ore deposits.

QUARTZ.

Silica, crystallized silicon, dioxide.

QUARTZITE.

A sandstone in which the grains are so cemented by silica that they break across when the rock is fractured.

RADIUM.

A metallic element derived through a series of intermediate elements from uranium. Radium is never found in sufficient quantities to be visible but occurs only with

uranium minerals in extremely minute quantities amounting at most to 3 or 4 grains to the ton of material. From these it is separated to obtain the radium salts of commerce.

RHYOLITE.

A highly siliceous compact or porphyritic, variously colored volcanic rock. The extrusive equivalent of granite.

ROSE QUARTZ.

Crystalline quartz with a rose pink color. Used as a gem or as an ornamental stone.

SALT.

Common salt, sodium chloride.

SANDSTONE.

Consolidated sand generally in beds.

SAPPHIRE.

Clear, blue corundum. A well known blue gem. There are also white, pink and yellow sapphires.

SHEELITE.

Calcium tungstate contains 80.6 per cent tungsten trioxide.

SCHIST.

A thinly laminated or foliated metamorphic rock, generally containing a large amount of mica.

SERPENTINE.

Hydrous magnesium silicate or a rock composed mostly of that mineral. Used for building and ornamental work.

SHALE.

A fine grained rock formed by the consolidation of silt or clay and fissile along bedding planes.

SIDERITE.

Spathic iron ore, iron carbonate. Contains 48.2 per cent iron. An important ore of iron.

SILVER.

An element sometimes found native. Metallic silver is extensively used in the arts and for coinage.

SLATE.

A dense, fine textured metamorphic rock whose separate minerals are indistinguishable to the unaided eye and which has an excellent parallel cleavage, so that it breaks into thin plates or pencil like shapes. Used extensively for a variety of purposes.

SODA.

A white alkaline compound. sodium carbonate.

SODIUM.

An element, the metallic constituent or basis of common salt, a soft, white, plastic metal which is slightly lighter than water but is widely distributed in rock-forming silicates and the chloride, common salt, which is the chief source of the metal and its salts.

STIBNITE.

Antimony glance, gray antimony, sulphuret of antimony, antimony sulphide. Contains 71.4 per cent antimony. The principal ore mineral and chief source of the metal antimony.

SULPHUR.

An element frequently found native. Sulphur takes fire at a low temperature and for this reason it is extensively used as a means of producing fire in friction, matches, powder and fireworks. It is used also for making sulphuric acid and in many commercial lines.

SYENITE.

A granular igneous rock composed mostly of alkali feldspar with a subordinate amount of the black ferromagnesian silicate minerals hornblend, biotite and augite, one or more of which may be present.

SYLVANITE.

A gold silver telluride containing gold and silver in the ration of gold 24.5 per cent and 13.4 per cent silver.

TALC.

A hydrous magnesium silicate. Has a greasy or soapy feel and is soft and easily cut.

TIN.

A white, malleable metallic element found in nature probably only in combination principally as tin oxide, casseterite.

TRAP ROCK.

A general name for dark, fine grained igneous rocks, particularly lavas or dykes of basalt, diabase and similar rocks.

TUNGSTEN.

A metallic element not found native. Its melting point is the highest of the metals. It is insoluble in ordinary acids

and when in the form of fine wire, its tensile strength exceeds that of iron or nickel. The great use of tungsten is as a component of the highly complex alloy steels known as high speed steel.

TURQUOISE.

Hydrous phosphate of aluminum and copper. A well known gem.

URANIUM.

A heavy, metallic element not found native. All uranium minerals contain radium.

ZINC.

An element not found native, in metallic form, cast in slabs, is known as spelter. Extensively used for various purposes.

Mineral Terms

ADAMANTINE. Having diamond lustre.

ADIT. A horizontal tunnel from the surface draining a mine.

AMALGAMATION. Combining mercury or quicksilver with another metal.

ALLUVIUM. Deposits of streams.

ANALYSIS. A chemical research whereby the nature and amount of the component parts of a substance are found out.

ARGENTIFEROUS. Silver bearing.

ARGILLACEOUS. Clay bearing.

ASSAY. A test.

AURIFEROUS. Gold bearing.

BASE METALS. Those not classed as precious.

BATTERY. A set of stamps for crushing ore.

BED ROCK. Solid rock below porous material.

CEMENT. Compacted gravel.

COLOR. A speck of gold.

COUNTRY ROCK. The rock enclosing a vein.

CRADLE. A mining apparatus; also called a rocker.

CUPRIFEROUS. Copper bearing.

DIP. The inclination of a vein at right angles to its length.

DRIFT. A horizontal opening in a mine or the rubbish left by disintegration.

DRIFTING. Driving a tunnel.

FAULT. A break in a vein or bed.

FLOAT. Vein stone or ore by which a vein is traced.

FLUX. Material added to help fusion.

FOLIATED. In thin layers.

GANGUE. Vein material.

GOUGE. A selvage of clay between clay and country rock.

IRIDESCENT. Showing the hues of the rainbow.

LITHARGE. Proto oxide in lead.

OPEN CUT. A surface working.

OUTCROP. That part of a vein showing on the surface.

OXIDATION. A chemical union with oxygen.

OXIDE. A chemical union of metal with oxygen.

PANNING. Washing gravel or crushed rock in a gold miner's pan to detect gold, etc.

PLACER. A deposit of valuable metals in gravel.

PLUMBAGO. Graphite or black lead.

PRECIPITATE. Matter separated from a solution.

PULP. Pulverized ore.

SHAFT. A pit giving access to a vein or working.

TAILINGS. The waste matter after ore has been crushed.

TRANSLUCENT. If light passes through a mineral it is translucent.

UNSTRATIFIED. Without stratification or bedding.

WINZE. An interior shaft connecting the levels.

Discovery Of California Gold

The existence of rich and extensive gold mines in California was discovered by James W. Marshall, an American citizen and a native of New Jersey, on the nineteenth of January, 1848. Gold had, previous to that time, been found, but in places where the mines were not extensive; their production was scarcely known to commerce, and their working, after long years, led to no important results. Marshall's discovery speedily and directly exercised an influence that was felt throughout the world, and gave a new life to trade and industry in Europe and America.

MINING BECOMES A BUSINESS.

Marshall was a man of an active, enthusiastic mind, and he at once attached great importance to his discovery. His ideas, however, were vague; he knew nothing about gold mining; he did not know how to take advantage of what he had found. Only an experienced gold miner could understand the importance of the discovery, and make it of practical value to all the world. That gold miner, forunately, was near at hand; his name was Isaac Humphrey. He was residing in the town of San Francisco, in the month of February, when a Mr. Bennett, one of the party employed at Marshall's mill, went down to that place with some of the dust to have it tested; for it was still a matter of doubt whether this yellow metal really was gold. Bennett told his

errand to a friend whom he met in San Francisco, and this friend introduced him to Humphrey, who had been a gold miner in Georgia, and was therefore competent to pass an opinion upon the stuff. Humphrey looked at the dust, pronounced it gold at the first glance, and expressed a belief that the diggings must be rich. He made inquiries about the place where the gold was found, and subsequent inquiries about the trustworthiness of Mr. Bennett, and on the seventh of March he was at the mill. He tried to induce several of his friends in San Francisco to go with him; they all thought his expedition a foolish one, and he had to go alone. He found that there was some talk about the gold, and persons would occasionally go about looking for pieces of it; but no one was engaged in mining, and the work of the mill was going on as usual. On the eighth he went out prospecting with a pan, and satisfied himself that the country in that vicinity was rich in gold. He then made a rocker and commenced the business of washing gold, and thus began the business of mining in California. Others saw how he did it, followed his example, found that the work was profitable, and abandoned all other occupations. The news of their success spread, people flocked to the place, learned how to use the rocker, discovered new diggings, and in the course of a few months, the country had been overturned by a social and industrial revolution.

RUSH TO THE MINES

The news spread, men came from all the settled parts of the territory, and as they came they went to work mining,

and gradually they moved further and further from Coloma, and before the rainy season had commenced (in December) miners were washing rich auriferous dirt all along the western slope of the Sierra Nevada, from the Feather to the Tuolumne River, a distance of one hundred and fifty miles, and also over a space of about fifteen miles square, near the place now known as the town of Shasta, in the Coast Mountains, at the head of the Sacramento Valley. The whole country had been turned topsy-turvy; towns had been deserted, or left only to the women and children; fields had been left unreaped; herds of cattle went without any one to care for them. But gold mining, which had become the great interest of the country, was not neglected. The people learned rapidly and worked hard. In the latter part of 1848, adventurers began to arrive from Oregon, the Sandwich Islands and Mexico. The winter found the miners with very little preparation, but most of them were accustomed to a rough mode of life in the western wilds, and they considered their large profits an abundant compensation for their privations and hardships. The weather was so mild in December and January that they could work almost as well as in the Summer, and the rain gave them facilities for washing such as they could not have in the dry season.

"It is often asked if mining, on the whole, is a profitable industry. It may be replied that it is not only profitable, but largely so, provided caution and judgment be exercised in selecting the mines, and due integrity, skill and economy displayed in their management. If, however, these conditions be not fulfilled, the most disastrous consequences may

be anticipated; since worthless undertakings will in this case be supported by the public, and after subscribers have paid extravagant premiums for indifferent properties, the capital necessary to develop them will either be squandered or injudiciously spent. * * * A capitalist wishing to become associated with a company prosecuting a mining enterprise, should first inquire into the character of the district in which the mine is situated; secondly, the honesty and ability of the person reporting on it; and thirdly, ascertain if the shareholders generally are in a position to meet the demands which a vigorous trial would be likely to impose on them. The constitution of the undertaking should also be investigated. Free shares are generally objectionable, and the system of giving a large sum of money for an untried property is highly pernicious; since in addition to its effects upon the ultimate profits of the concern, it encourages misstatements, and tends to support a class of unscrupulous speculators, through whose agency this branch of industry has been chiefly brought into disrepute.

"All mineral explorations should be conducted as rapidly as possible, for the purpose of lessening the aggregate amount of dead charges, and a practical, intelligent and honest man should be entrusted with the direction of the works. It is by no means essential that such a person should possess an elaborate education; but his ideas relative to the exigencies of his profession should be clear and well defined, and he ought, moreover, to be familiar with the use of the dial and with all the various operations of dressing and pre-

paring the ores for the market. Grave mistakes are frequently committed by entrusting the local management of mineral undertakings to men who possess but a superficial acquaintance with the subject, and who sink large sums of money in the multiplicity of their schemes for economizing expenditure. Such persons often make extensive surface erections before proceeding to the development of the underground works, and from mere love of display absorb an undue proportion of the capital, forgetting that their arrangements can only be valuable in proportion as the mine itself becomes productive. Hence the undertaking becomes prematurely embarrassed, and is sometimes obliged, from this very cause alone, to terminate its existence.

"The radical principle to be observed by the capitalist, when about to invest money in profitable or established mines, is to distribute his means over a considerable number of them; since to adventure in any single concern is, with the best advice, a matter of considerable risk. Moreover, it is not judicious to confine investments to one district or to one class of mines alone; but to select the richest localities, and according to their importance, give the best mines they contain a pro rata proportion of capital. It should also be borne in mind, that certain adventures are so worked as to afford regular periodical dividends, while others only yield returns at irregular intervals. These two classes of properties do not necessarily imply that different systems are pursued in their mangement. Permanent dividend mines are often more advanced in their explorations than those

which yield irregular profits; and although the percentage of returns is steadier in the former, yet the probability of improvement in the market value may be considered greater in the latter; thus allowing capitalists to realize a profit in one case which could not be obtained in the other.''

Preface To Appendix

The Author of the Miner's Guide has for many years searched for precious metals, etc., and during this search for wealth, sometimes with pack animals as a means of transportation, sometimes with the luxury of a team and wagon to haul conveniences never dreamed of with pack animals and personal packs. He has traveled into most mining districts of the Pacific Coast and the desert districts in particular and during this thirty years of experience lived among the Indians and met miners and prospectors from every district on the desert. He thus had an opportunity to obtain information of value by keeping notes of what he heard. In this way he heard of "Lost Mines." He personally knew many of the characters mentioned in these stories and traditions and he spent many months of hardship looking for some of these lost mines but has never been fortunate enough to discover any of them. These stories are printed here for the reason that they are interesting to any person contemplating entering the mining field because it gives him an insight into the difficulties the prospector encounters in his search for wealth. Most of these stories on lost mines have a foundation o f truth but the author cannot vouch for the greater part of the traditions.

The Lost Mines of the Desert

A crowd stood gaping into the wide window of a Spring Street store in the metropolitan city of Los Angeles. It was an awed crowd, that continued of large proportion throughout the day. Toilers from the factories intermingled with men from the offices, while society women, stepping from their limousine cars, edged through the ranks of the working girls who were also numerous in that always-changing crowd.

The lure of gold drew them there, rich and poor alike. It was the actual metal, the real yellow wealth in its various forms: quartz rock that exuded it from every pore, the nugget worn smooth on the rock bed of a stream, and the dust. It was dramatically displayed, not from a mirrored surface as though in a jeweler's cabinet, or from out the folds of rich velvet, but in its native element, lying amid rocks and sand.

It was depicted as a desert scene, weird in every detail, created by the hand of a master in topographical work and staged just within the heavy plate glass. The sands were molded into dunes and mounds across a long, flat plain and led into a mountain range which formed the background. And on this miniature desert waste were strewn equally miniature marks of the luckless adventurer who had

threaded the waste in search of wealth. His bones, with those of the pack mules, lay bleached beside the rusting tires of a wagon-wheel, telling a gruesome tale of lost hope and lost life.

And back among the mountain canyons were manikin men who toiled at the building of roads, at cutting away ledges of pure gold, at sinking shafts and erecting smelters. It was all real, so real that men and women seemed semi-hypnotized, and many of them succumbed to the honeyed words of the glib talker who invited them within the doors of the place for further examination of the newly discovered bonanza.

He was attired in the stage version of a typical prospector, wearing high leather boots, corduroy pants buckled within their tops, blue flannel shirt, red tie and topped with a wide sombrero. His chief duty lay in the distribution of highly illuminative literature on the rediscovery of one of the world's greatest mines, the famous Esperanza de Guanarre of southwestern Arizona near the border of Mexico, and extending the invitation to the flies that were caught in the web of curiosity to come into the parlor of the spider who peddled mining stock. Once within, the smooth talker, full of statistics and some facts relating to mining and particularly to the fabulously wealthy Annuncion property in southwestern Mexico, unfolded a tale of hardships and adventure.

He told of the wealthiest mine on the American continent, lost more than a century ago after having paid its thieving,

narrow-minded and illiterate Spanish renegade owner millions and millions—so many that the taxes which he contributed to the Spanish Government and the missions amounted to nineteen millions in a period of only a few years.

"And think, my dear sir, think of it, this was but a per cent of the total which the man garnered from the immense hidden vein of pure metal which until several months ago lay idle only to be discovered by old John Milligan!" said this "con" artist.

And if the visitor was at all interested at this point in the narrative, an old miner, deeply wrinkled, poorly clothed, but enthusiastic in the extreme, was called from an obscure corner and introduced as the discoverer of this pot of wealth. In quavering voice he told of his years of toil; dramatically he depicted his sufferings for want of water, for lack of food.

Almost invariably this brought the matter of stock to the foreground, revealed the fact that all that was necessary to bring this immense wealth to the mint at San Francisco was a railroad to the mines. Money for this was essential, and because of a desire to give many, instead of a few capitalists, the opportunity of adding still greater burdens of dollars to their already large packs, the general public was given this opportunity to subscribe for a few shares.

So perfect was the staging of this financial bubble, so harmoniously conducted were all the details, that within

three weeks the four men who controlled the combine had managed to clear up something like seventy-five thousand dollars on stock that sold for twenty-five cents the share. Only the fact that they used the mails led to the sudden termination of operations. The Federal authorities had been making an investigation and had found total lack of property to be one of the chief reasons why the swindlers should not be taking-in a gullible public. Three of the four get-rich-quick artists were landed behind bars, while a fourth, having had an inkling of what was coming, managed to get away with a good portion of the public contribution.

The trial revealed that stock purchasers were of all classes —not confined to the ignorant, to the middle class or to the rich. The phantom of quick returns on little investment, the roseate dreams of opulence without work, and the idea of having a share in a famous lost property with a history had landed its suckers by the score and the hundreds. And this was but one of hundreds of similar swindles that have been perpetrated in the past or are being carried on right at the present time and finding new "marks" to trim.

Usually the story of the lost mine is the bait used to land the fish. There have been dozens of these properties, and from time to time old tales are renewed by a sudden strike. Right at this moment there is an old miner in San Bernardino, California, who claims that he has discovered the very mine referred to above, and he is sincere in his belief of location. There are countless miners who have deluded them-

selves into the same ideas, and some of them have actually discovered what have been lost mines.

These will-o'-the-wisps have beckoned many men from their homes, have sent them into hopeless regions where starvation and despair have been their only reward. They have proved to be the rocks on which the miners have been wrecked, the beacons that have gone out, and the evanescent mirages that have lured onward to fatal endings.

On the other hand, they have been the means of bringing about many other valuable discoveries of mineral wealth. They have led the phantom-chaser to other riches than the pot of gold at the end of the rainbow.

The lost mine finds its way into the home of the elite occasionally, into the columns of the papers periodically and is always on hand to help while away the nocturnal watches around the camp-fire of the prospector. In the clubs and the bar-rooms of the Western cities where mining men congregate, where they mingle with men of social and political power, with adventurers from the South Seas, soldiers from the Philippines, traders from the Orient, the lost mine is always one of the most interesting topics. Among these are some that have been classed almost among the fables of the ancients, but, despite that, have their foundations deeply rooted in fact.

"THE LOST ARCH" DIGGINGS

Somewhere in the northern portion of the Turtle Range of mountains, a range east and south of the range designated

as the Old Woman's Mountain on the Colorado River in California, lies the Lost Arch, twice located and twice lost by the peculiar working of Providence.

Jim Fish and his partner, a prospector who arrived in the days of the first gold rush to California, were traveling from Nevada to California in the year 1883, in an old-fashioned buckboard behind a team of stringy bay horses. They had apparently filled their barrel of water at the Colorado and continued on their slow search for hidden wealth.

For months they had been prospecting through the little-known country, stopping here and there, climbing hills and following streams through unknown ranges. Occasionally they secured sufficient game to supply them with meat. Once or twice they met with friendly Indians and bartered for dry corn and beans which were grown on the high and almost inaccesible mesas of that part of the country.

And then came the event which startled them. They had traveled two days from the Colorado when Fish happened to investigate more closely the water-supply. He had turned the barrel up and found that little fluid was forthcoming. Almost frantically he pulled out the bung. He rolled the barrel around to the opening and carefully placed beneath it a bucket. Less than two canteen measures remained.

The situation was not entirely new to a veteran in the mountains, but he at once realized the dilemma that confronted him. He waited for his partner, whose name is said to have been Crocker, though this fact has never been estab-

lished, and when he came in from his trip to the adjacent hills he imparted his bad news.

Some vegetation showed on the range near at hand and it was decided to risk a day in search for the precious fluid in the gulches and canyons of the mountains.

"It's our best chance," said Fish to Crocker after the two had talked over the matter for hours into the night.

So early in the morning, after four or five hours of rest, they started resolutely to the hills.

"Crocker went up one canyon while I took another, the one to right," remarked Fish, in the months that came after when he recounted the story to friends in San Bernardino, California.

"The main canyon deployed into a gulch on the right and I decided to follow this through the hot sun and down among the rocks so far that not a breath of air seemed to pass through the cleft. On and on I went, over stones larger than a house, around smooth and slippery boulders where water had certainly been at one time, but where then not a trace showed.

"My feet were lagging, my shins were barked and aching, for in the rush I had neglected to be careful. Turning a sudden corner in the gulch, I came upon a natural bridge that spanned the canyon. It was so odd, so regular in the outline of an arch that I could only stand and admire it. Beneath its shade, the most cooling place in that hell-hole, I found a large sandy area and there sank down to rest.

"While idly scratching the sand, which seemed coarse and heavy, its peculiarity attracted my closer attention. I got down on my knees and started to blow the dust away, and there before me I had a great pocket of precious metal, gold that averaged the size of wheat grains. I filled several pockets with the heavy grains and, with all thought of thirst forgotten, hurried excitedly down the canyon to impart the news of the find to Crocker."

Arriving at the wagon, Fish was forced to wait several hours before his partner arrived, and in that time his brain had a chance to cool. Crocker added to the coolness when he came back despairing, for he also had failed in finding water. The gold stirred little excitement in his mind. It was a case of water, and the nearest lay in the Colorado, two days back.

Gold dropped its mask of friendliness when the two prospectors started back in fevered haste and with perturbed thoughts as to the outcome. Their canteen of water had to do for two animals and two men, any of them having a thirst at the time that would have made short work of a single canteen of water.

This was doled out by the spoonful. The horses were not given a drink, their mouths being merely rubbed out with a damp cloth. They passed mile after mile of the weird sand-dunes that seemed to chase each other in serpentine waves, gray-brown, grotesque and awful dunes that fashioned forms of ghostly nothingness on nearer approach.

The blistering sun burned through their thick flannel shirts; it seared the very marrow in their bones. When the fading folds of light finally gave way to the pall of darkness and the cold they were in torment. Their water was all gone and they had still a day before them. Far into the night, with its intense blue sky, its occasional stars, they plodded.

And then they staggered to a rest. Their physical beings refused further to answer their demands and their horses could scarcely drag on. So they rested.

Before morning light had thrown its rays across the desert they were up again. Today it was worse than the day before. They had lost their sense of direction. The sand seemed to engulf their feet, to reach up and clutch their legs in an endeavor to hold them. They stopped trying to drive the horses, but allowed the poor animals to stumble on ahead and followed in their tracks.

When hope had just expired and everything seemed gone —the chance for wealth, the hoard of gold within the mountains and, what was more, life itself, they saw, away off. the fringe of willows. They were too tired to rush on. Instead, they both lay down and rested.

And when they finally did reach it they did not drink, but dropped into the cold, swiftly moving water at the bank and saturated every pore of their skins with the life-giving fluid. For Crocker the water had come too late. His vitality had been sapped, his nerve was gone and his system depleted of every particle of life. Nothing that Fish could do for him

would bring him back to health, and instead of returning directly to the mountains of the arch, Fish was forced to go on to Ehrenberg, where Crocker was given medical attention, but despite this he died within the week of reaching there.

It was weeks before Fish recovered from the shock, and three months before he started out by himself to relocate his treasure. He thought it lay in the Old Woman's Mountain range, not strange because of the similarity of it and the Turtle Range. He failed the first, second and third times and many other times, until he finally gave up his fruitless task, having expended the small fortune of a life's making without finding his one great treasure.

This was not the end of the arch, however. A German prospector, whose name was thought to have been Peter Kohler, came back to corroborate the fact of the arch in the Turtle Range. It was in 1900 that he had been prospecting through the country. One day, after having climbed over a ridge, he gradually worked his way down the northern side and landed on a little mesa just above a peculiar arch. He had been a naturalist in his native land, and its strangeness made him forget all thought of gold.

He had been successful in finding several valuable claims and was going back to some settlement to find a prospector who would be willing to help in the first development of the properties he expeted to obtain. Getting out of the moun-

tains, he struck across the desert to Needles, and on the way there he fell in with a prospector by the name of John Packer.

On their first night together, with the novelty of human companionship after weeks of solitude, Kohler told many things, among them the story of the arch. He himself had never had an inkling of the wonderful deposit of gold that lay beneath its span. The story of Fish had not reached his ears and he had overlooked the opportunity of a lifetime.

Packer realized at once the importance of the discovery, but said nothing of that to Kohler. Instead he made an appointment to meet him in twenty days at Sunflower Springs with an outfit that would last for three or four months in the mountains.

Kohler continued alone to Needles and, being greatly in need of immediate cash, obtained a job on the Santa Fe. He was sent to a little station at Amboy where considerable lumber for building and some mining timber was being shipped. His work was helping to unload it, and on the third day several heavy timbers toppled over and killed him almost instantly. When Packer, who waited several days over the appointed time at the Sunflower Springs, did not hear from Kohler, he hurried to Needles and there heard the news of the accident. Without waiting for further word, he started out with his outfit, and for nearly ten years he has been going through the two ranges in which the arch is located without being able to find it.

THE PEG-LEG MINE

Just about twelve years ago the great Southwest was awakened by the possibility of the relocation of the widely known Peg-leg Mine. The Southern Pacific Railroad was doing considerable work through Imperial Valley, a valley which five years previously was one of the hottest and most forsaken deserts on the American Continent, but which, with the coming of water through the extensive irrigation system of the Government, has grown to be one of the brightest garden spots of the world.

The only human beings who ever ventured into the valley before the bringing-in of water were the prospectors and then the engineers and their crews of hardy linemen, rodmen and assistants who were surveying roads, lateral canals for subsequent irrigation, and similar work. A large crew was stationed between Ogleby and Salton, rebuilding much of the track. They were near a watering-place called Glamis when the incident occurred which sent many of them scurrying from their work into the mountain ranges in a vain effort to find the wonderful property that they knew must exist.

While driving the work along slowly under the brazen sun and amid the occasional sand-clouds stirred up by a slight breeze from the mountains, a figure appeared in the distance, just a vague, traceable figure, slowly and wearily pushing along through the clogging sands. As it approached, it resolved itself into a wandering Indian squaw, apparently half dead from lack of water, who, without going near the workmen, passed on to the tank and there started to drink from the small open trough.

Thinking to assist her when she seemed about to drop into a heap from nothing more than the exhaustion of her toilsome journey, several of the men started in her direction. She saw them coming. With an effort she arose and made off with all speed down the track in the opposite direction.

She was followed for a distance until she turned off into the desert again, and, having no great interest in a single squaw, the men returned. On arriving at the water-tank they discovered an old piece of blanket securely tied in a knot. On opening it they found a lot of black pieces of metal, which under a knife revealed pure gold of darkest hue. They were nuggets, dozens of them, varying in size from smaller than a dime to the size of an English walnut, and all of them black.

Hastily the men tried to follow the squaw, but by this time she had disappeared in the same range of mountains to the north from which she had been seen to emerge. When the finders of the gold had an opportunity of having the metal assayed and valued, they were brought to a realization of the worth of the discovery. The little pack had contained more than two thousand dollars' worth of property.

Such a find could not help starting a search and creating talk, and it was but a short time before a number of old miners were on the scene. They knew the value of the black gold and also that in this section, buried far from observation or generally overlooked by prospectors who had been through the ranges before, lay the old Peg-leg Mine with

its fabled wealth. There was a stampede from the camp, which did not last long on account of the hardships the searchers had to face.

Only in the northwestern part of the range is there any living water, the Salvation Springs. Other portions of the range contain huge natural tanks in the mountains, which at that time were discovered in all but one or two instances to be dried up. As a result, only a few hardy prospectors were steady in their search, which had its original inception in 1853 when "Peg-leg" Smith wandered into Mohave with nearly ten thousand dollar's worth of black nuggets in his possession.

The day he pulled into the mining-camp with its three saloons and two stores, his lips were cracked and black, his tongue parched and swollen, and his hands almost bursting from the pressure of blood caused by long tramping. His mule had saved his life by half dragging him to the camp, which he would never have located alone.

For several days he lay abed, gripping the saddle-bags which had been brought into his rooms in one of the shacks that served as saloon and hotel. When he recovered consciousness and health, he opened the sadle-bags and satisfied the curiosity of the hundred or so prospectors who were working in the vicinity.

What they saw startled them. It was black gold. Nuggets, hundreds of them, as black as coal on the outside, but pure dull gold within. "Where did you get it?" was the

question, and Smith tried to tell them, after securing from each of them a promise to share in the wealth should they find it.

According to his story, he had been living with the Yuma and the Cocopah Indians along the Colorado River for several years. Away from the river the land resolved itself into the driest, most desolate region imaginable, a region they seldom ventured into because of their dislike for their God of Fury, who overwhelmed them and buried them beneath the swirling sand-dunes when they sought the black pebbles.

They told stories of great treasures of yellow metal, but never ventured after it themselves. Smith, who had lost a leg while in an encounter with the Indians in crossing the plains, hoarded up all the stories, and after securing all information possible he decided on a trip to San Francisco to obtain a partner in his work. At that time the desert was not mapped, and it was a really hazardous undertaking for any man to attempt.

In this desolate region Smith lost his bearings. The fierce yellow sun, the dancing, jiggling heat-waves, the dust-flurries confused his direction. He finally climbed upon a black butte that stood near by and, arriving at its summit, probably fifteen hundred feet in the air, he attempted to locate his whereabouts.

"When I reached the top," he told some of his friends, "I saw just a short distance away another butte of exactly

the same height and type as the one on which I stood. It was connected with a low saddle, and the twin buttes were isolated from the main range. Finally I decided on the way I was to continue and started back down the hill to my mule, which had remained at the foot of the incline.

"I had tied the animal to a boulder in order to prevent it from breaking away and carrying off the only water-supply available for perhaps a week or more. Rather restless, the mule had stamped about and kicked up some good-sized pebbles that showed a strange glint where the hoofs had struck. Picking one of the black stones up, I pulled out my pocket-knife, scratched its surface and found that it was gold."

It was a repetition of the old Oriental fable of the stranded Arab on the desert, who came across a sack of pearls when he sought figs and water. Smith was running short of food and water and could take only a few pounds on the already overcrowded mule, and these he placed in his saddle-bags, proceeding then on his route.

After he had recovered sufficiently, he started out to relocate his valuable property. Others had preceded him, and a number followed close along, hoping to be with him in the find. For days he wandered about, but the twin buttes had disappeared as if by the magic of an Aladdin's lamp. He tried time and again, as did dozens of others, to locate the immensely wealthy find, a place, as he explained, where black gold lay strewn for blocks over the ground and looked like mere chunks of rock and lava pebbles.

He never succeeded in his quest. Nor has any one else. There have been many mints located in the district of the desert—the Mesquite Placer Diggings in the central part of Imperial County, which have produced thousands and thousands of dollars, the Ogleby Diggings, the Salvation Springs Diggings, but not the mine of black volcanic-like gold. There are many black buttes in the country, but they, too, have failed to give up the secret of Peg-leg's lost properties.

THE LOST PAPUAN PLACER DIGGINGS

Papuan, last chief of a small tribe of Papago Indians, who lived during the early part of the last century in the mountain fastnesses of western Arizona, discovered one of the richest placer diggings in existence. In the terrific struggle with the Apaches and other hostile tribes the Papagoes had been entirely wiped out; Papuan was the last man of the tribe to escape the hostile arrows, pitfalls and traps that were laid for him. Only one tribe had treated his people favorably, the Mohave Indians.

When all hope for his people was gone, he wandered into the tribal territory of the Mohaves, which was located in what at this time is Yuma County on the Colorado River. There he took up with an old squaw, who seemed almost friendless among her people, and the two were married with all the tribal ceremonial.

The squaw was not unappreciative. She wanted to show her devotion to her lord and master, and frequently the two Indians wandered away from the remainder of the tribe for

days at a time. Whenever they returned they brought with them nuggets, all they could carry, and distributed them among the other Indians and bartered with the few white traders who happened that way.

One of them, Bill McCoy, after whom the McCoy Range of mountains in Riverside County, California, is named, was running a store at Ehrenberg, a Government post; in California during 1864 and for two years later. To him came Papuan with his hoard of gold, so much that McCoy could scarcely believe his eyes. The Indian bought lavishly, traded for anything and everything that his heart desired. and in less than two years had contributed to McCoy about seventy-five thousand dollars' worth of gold nuggets.

The trader tried every possible ingratiating method to learn the secret of his mine. He wheedled, coaxed, threatened, made big offers of beads, jewels and horses, but never could learn Papuan's secret. He sent his men to follow him, but they were never successful in keeping the trail. The Indian eluded them.

In 1886 the Apaches carried their enmity to the Mohave Indians and by their indignities stirred them finally to battle. Papuan, a valiant warrior in his day, joined the people that had made him one of their own. He was killed, but in the rout of the Mohaves, his wife managed to escape.

The story of the gold had been wafted abroad, and about fifteen years ago a middle-aged German of stalwart build, H. W. Hartman, arrived in Ehrenberg and began collecting

the data pertaining to the placer diggings. He discovered that Papuan's squaw was still living and his plan at once embraced her. He sought out the decimated tribe and found the squaw, now a withered old hag, and began to work upon her sympathy.

He cared for her like a son, looked after her every want and all the time tried to secure from her the location of the rich treasure-trove. For months she refused to divulge her secret, and Hartman had just about decided that all his work was vain, when one day she told him to prepare for a journey into the mountains after the treasure.

At the same time she was stricken with a severe cold. The cold became rapidly worse and finally evolved itself into pneumonia. Her death was only a matter of hours. Hartman did not lose all hope, however, for she informed him of one other who knew the secret hiding of the placer, one Chinkinnow, who to this day is still alive.

On him Hartman lavished his attention. Chinkinnow was afraid of the spirits of those who had gone before. He demurred, refused, then half promised, and one fair day he started out with the German to show what he had seen as the adopted son of Papuan on two or three visits to the diggings. He struck out for the southeast end of the Papuan Range of mountains, came to within a few miles, then contrived to destroy the greater portion of the water-supply, and the trip had to be abandoned to hasten back to the Colorado, twenty miles away, to secure the needed fluid.

Then Chinkinnow refused absolutely to go again. Hartman went, but failed to find the diggings in the canyons and gulches that in late Summer are filled with torrents which tear through the range with perfect fury. In a few weeks they again are as dry as the desert itself. Many times the shriveled old Indian has accepted large fees to take prospectors to the place. His cunning old soul has always found a way to get out of accomplishing the feat. Always, however, as though by instinct, he has started in the same direction.

Yet prospectors have not failed entirely for their trouble. They have realized that because of the heavy wash each year the workings of old Papuan and his squaw might be entirely obliterated with the continual addition of rocks and boulders and granite to the surface of the gulch beds. With dry washers, which have just recently been invented, they have managed to make their trips pay dividends on account of the finding of other gold.

That the placer is in the mountains and not on the desert they feel certain, because of the natural concentration which occurs in a gulch or canyon. Chinkinnow has refused to give even this information, but at Ehrenberg and at Blythe, the two towns which he visits, he is always under surveillance with the hope that he may accidentally give away the secret he carries with him.

THE LOST BREYFOGGLE

Ash-Meadow Charley, bad man of the Piute Indian tribe, is probably more to blame than any other living agency for

the loss of a quartz mine that, from specimens assayed, showed value of one hundred thousand dollars a ton, for it was he who with an ax hit James Breyfoggle in the head and mentally deranged him for the remainder of his life, in periods of a few days and, as he grew older, almost continually.

Breyfoggle in 1863 had found his way into Austin, Nevada, and from there had proceeded in a leisurely manner southward into the Funeral Range of mountains, which border upon that desolate and unalterable waste of heat and mystery, Death Valley. In his wanderings he remained well within the boundaries of Nye County, so far as research has been able to ascertain.

One evening, while making ready for his camp, a terrific storm, the kind that comes but once or twice a year in that section of the world, broke in all its windy fury, and Breyfoggle camped on the side of an abrupt peak and beneath a hanging ledge which afforded protection from the storm. He hobbled his horse (some men claim it was a burro, but from more reliable sources it is generally conceded a horse) and turned him loose to browse on the sparse vegetation to be found there.

The storm had little effect in keeping him awake, and with the rise of the sun he was ready to go on. Lo and behold! his horse, however, had disappeared. For an hour or more he trailed it up and down, finding its broken hobble, and returning eventually to his camp. After a bite of food, he

climbed to the opposite side of the peak beneath which he had rested and, gaining an eminence of considerable extent, he pulled out his field-glasses for a survey of the general profile of the country.

Tired with his arduous exertions, he leaned against a ledge and quietly gazed upon the surrounding country, locating on his right a heavily timbered mountain and on his left a broad valley which showed considerable vegetation, very unusual for that part of the mountains.

His horse failed to come within his range of vision, and in half despair he turned and started to obtain a position a trifle higher up on the ledge. His hand struck a loose rock that, turning, glinted brightly in the sun which was just edging its way from among the dark gray clouds. He caught his breath. He looked a second time. Sure enough, it was gold, real gold, and not the metal that is its counterpart and has oft been designated "fools' gold."

The dull sheen came not alone from the single rock that he held in his hand. It cropped out from the surrounding rock as far as he could reach to brush away the particles of crumbling quartz. It was everywhere, and he broke off large pieces of the ore in his delirium of discovery. While it lasted he reveled in his new-found riches, sat among the hard rock pillows that spelled millions and continued his examination of the ground.

After hours he came to his senses and also to a realization that his horse was still straying. With a start he collected

all of the ore he could carry and continued to trail through the few available mountain washes passing sun-blackened, weather-beaten cliffs, into dust-gray sage and the debris of countless ages until he located a lone willow.

His horse had been forgotten in the increasing thirst which had made itself a factor by gnawing at his stomach, demanding relief. The willow stood for water, and hastily he stumbled over the corroding, gold-filled ledges to find himself finally before a spring that bubbled out of this forsaken ravine. Then, spurred again by the thoughts of his animal, the food that he had left behind and the desire to get out and announce his discovery to the world, he wandered off into the twilight and, soon, the night, which comes suddenly in that portion of the world.

For days—how many Breyfoggle was never able to compute—he wandered about almost aimlessly, stumbling at last, more dead than alive, into Stump Springs, which are located twenty-two miles from Sandy and nine miles from Manse, all situated in Nye County. It was there that he encountered the band of wandering Piute Indians. Their love for the white invader was small, and although not of the same fighting blood as the Apache or the Sioux, they fell upon the half-crazed miner, who in all probability stirred their animosity by some untoward act, and Ash-Meadow Charley, so named for the fact that he had resided for a time in after years at Ash Meadows in Nevada, struck him with an ax.

The blow was a glancing one, inflicting a severe wound, and it would have been followed to its termination by others

had not one of the other Indians interceded. They packed Breyfoggle on one of their horses, and when near Las Vegas started him for that place, where he landed in a half-dead condition, but neverethless clinging closely to his ore. In several weeks he was physically able to be sent to Austin, Nevada, where his family resided.

After more months of rest he at intervals had periods that were lucid, and in these he told of all his hardships and sufferings. His discovery was sent to an assayer's office and the production, according to the samples, would have run over one hundred thousand dollars to the ton, so rich was it in gold. Had it not been for the ore, little credence would have been given his tale because of the deranged condition of his brain at most times.

Nor did he stop with telling of the discovery. Time and again he set out with his horse and pack-saddles into the territory which he thought held the riches that would put him beyond the haziest dreams of Midas. He enlisted his friends and even went so far as to locate Ash-Meadow Charley, who lived in after years in the Pahrump Valley, to assist him in the search, but all in vain.

About twelve miles south of Daylight Springs, where the eastern edge of the Funeral Range approaches Death Valley, there is a place named "Breyfoggle's Despair," for the reason that here, in the middle of the sun-parched desert, are five of his trails, meeting in a star-like center and leading off into the solitudes of the surrounding country without

reaching the ultimate goal. On his deathbed he declared that whoever would locate his discovery would have sufficient to enrich all of his friends and pay off the national debt.

Whether or not the Breyfoggle discovery continues among the great lost mines of the country is a doubtful question with many mining men who are thoroughly familiar with all its details and who have been among the many to try to rediscover the wealthy ledges. Breyfoggle's continued endeaver to rediscover his property, and his story of the wonderful find, proved the incendiary torch to the imaginations of many prospectors who were fired with the desire to locate the hidden wealth.

Forty years of search has not dimmed the tale in its telling. It is recounted over and over, and continues to draw the daring prospector into that region of little water and hard struggles. Nor have these other prospectors always looked in vain, for other valuable ore bodies have been located by the search.

One of these, the "Johnnie Mine," is frequently pointed out as the property which Breyfoggle found because of its general topographical outlook. Located in the southwestern portion of Nye County, it stands on a high ledge which has shown wonderful specimens of gold from the surface croppings. On the west of the mine is located the valley of much vegetation, Ash Meadows, where grow the scrub oak, the mesquite and many smaller plants of their own accord. On

the other side stands Charleston Mountain, the only timbered peak in all the range, which probably is the timbered mountain of Breyfoggle's description.

Lenses of very high grade ore, running more than a third pure gold, have been found on the surface, and it is possible that the prospector, in his haste to find his horse, locate water and return to a place of plentiful food, made only a superficial examination of the property, striking several of the rich lenses and proceeding no farther in his haste to get back to civilization and outfit properly for the real work of obtaining his princely wealth.

THE LOST DUTCH-OVEN MINE

When the railroads built their transcontinental systems, one of their greatest difficulties lay in the supply of water for the men who were working on the projects. Great wagon-trains were frequently essential to bring sufficient of the supply to make work for a week at a time possible. Even after the completion of the roads there was difficulty in obtaining water for the purpose of supplying the engines or the little stations necessary wherever there was a siding.

In order to secure water in abundance, the Santa Fe Railroad had ordered a tunnel bored in the Clipper range, located in San Bernardino County from eight to ten miles northwest of Danby, the station to which it was to be piped if discovered in a large quantity. This all happened within a score of years. The man who volunteered for the work, a competent mining man, who was well acquainted with the

sinking of shafts and the boring of tunnels, was Thomas Schofield of Los Angeles.

Tiring of work one day in early June of 1894, he started on a prospecting trip, something which he did whenever he felt in need of relaxation. He wandered into one of the canyons close at hand and discovered there a spring. What to him was more surprising and even startling was the trail that led up the canyon, stopping at the watering-place.

The trail, at times very indistinct because of the solid rock formation, led over three or four small hills, the hog-back of two ranges and then into another canyon. This he followed until it ended in a blank wall and he realized that the trail had been lost. Going back a short distance he discovered it winding up the side of the hill. It led to two immense rocks, rivaling the towers of an old English castle. They seemed to form the portal to the wealth beyond, and nature had set them so closely together that they allowed just sufficient passageway to permit a burro well packed to enter.

And just beyond the portal stood an isolated rock. There beside the black boulder of enormous size stood the shreds of what had been a camp. The wooden upright supports were still standing, and draped from them, floating in the breeze, were the shreds of what had been a tent. Brush had been carefully piled up around the sides. Inside there was a bench of boughs, still covered with a blanket, which was, like the tent covering, dilapidated and ragged. The stillness

of the place and the fact that man had been making his habitation there struck Schofield like a blow from a fist.

A pile of railroad ties, a number of rusty old axes which had been used as wedges for splitting the ties for lagging, a few other mining tools and some badly decomposed food still lay about the place, indicating very sudden abandonment of the camp by its owner. The most conspicuous of all things about the place was an old-fashioned, heavily rusted Dutch oven, the largest Schofield had ever seen and a trifle over two feet in diameter. So oppressive was the place and so nerve-racking the immediate strain, that he continued on the trail which led away from the camp.

Just a short distance away he came to a shaft where considerable work had been done. It was sunk upon a series of small stringers that ran parallel to one another for a long distance and at intervals of about six inches. He counted twelve of these peculiar formations in the rock and they were of almost solid gold! He tested them, "horning" great strings of coarse gold.

The surrounding ore was of an indigo-blue quartz formation, and "to me the stringers, passing through the dark porphyry, appeared a bed of roses of golden hues hidden in the depths of a giant bed of violets," said Schofield in telling of his discovery. "I traced these lines of high-grade ore for a distance of nearly three thousand feet, and found them widening and enlarging as they went. They interested me

so that I failed to notice for hours that the day was fast waning and that I would be forced to remain there overnight.

"The mystery, the awe and even the fear of that night I shall never forget. Was I in the haunt of a robber crew who had found wealth far richer than could be obtained from their nefarious trade in the city? Had the owners been cruelly murdered and their wealth carried off by some one else? Was I the victim of some strange phantasmagoria, or would I waken to find all the wealth and the adventure of the day a dream? These and countless other suggestions coursed through my throbbing brain, and I slept little that night.

"In the morning I explored the shaft at the first light of breaking sun above the jagged sky-line of broken peaks. I found that the shaft had been sunk to possibly seventy or eighty feet, that it was equipped with a windlass, rope and bucket and that it had been well timbered all the way to the bottom. Outside I discovered a large pile of ore, indicative of the fact that little or none of the product of the mine had ever been carried away.

"After gathering a number of fine samples and a large quantity of the horned gold, I went back to the camp and there again I was attracted by the Dutch oven. Something seemed to draw me toward it. It contained gold! Half of it was full of the product and there was I unable to cart it away. All marks of those who resided there were of such

an old stamp that I never thought whether it would be right or wrong. The idea of possession of so much wealth nearly overwhelmed me, and after grasping some of it I started back to the camp by the tunnel, planning a trip to Los Angeles to see whether it was really gold that I had found.''

And when Schofield had his ore and his metal tested he found that it was the real article and that he had made himself richer by several hundred dollars with just the small amount he had been able to lug out on his person. It fired him with the desire to return at once and obtain all of the treasure if the right owners had not returned. But he has never been able to get back to the Dutch oven!

In coming back from the mine he had paid little heed to the general direction taken. He had followed the trail blindly on his way up and again on his return journey. Consequently after a number of weeks, when he returned with a partner to look for the treasure and found that some terrific rains and even a waterspout had been ahead of him, his plans became hazy. The water had obliterated all signs of a trail and his knowledge of getting back was gone with it. He had even forgotten the general direction, and in the years that have followed he has never been able to discover the towers of rock, the solitary mass of granite where the camp stood, or the mouth of the tunnel and the ore-heap that lay before it.

He told friends and they in turn told others of the wonderful Dutch oven. In the annals of mining, no one has ever

heard of a wonderfully rich discovery in the Clipper Range. There are no mining men who speak of the place knowingly as having worked it or worked with those who had worked it. The camp remains a mystery, and were it not for the wealth that Schofield brought back with him, his story might never have gained the credence that it has. He is still living, and tells with great enthusiasm the manner of his discovery, but puts on the soft pedal when it comes to his loss. The gold would have meant so much in the worldly goods and his family's comforts at this time.

LOST TUB PLACER

Men will sacrifice love, life, virtue and kindred things if there is a great opportunity presented for the accumulation of sudden wealth. Strange alliances, stories of murder, long legal fights and bitterest enmity have grown up in the Southwest as adjuncts to the continued hunt for treasure. Among the strange stories that are more widely known is that which has to do with a lost placer of great riches.

It finds its origin in the early eighties, either 1883 or 1884, when a white man, a lone prospector, wandered into the camp of the Piute Indians at Piute Bend on the Nevada side of the Colorado River. The bend lay only a few miles above Fort Mohave, and it is there that Jamison, which is generally given as the man's name, gathered his first inklings of the storied wealth accumulated by several members of the tribe.

They were said to know of several great gold deposits in the desert and mountain country continguous to their place

of living, and from these they frequently brought to Fort Mohave splendid specimens of nuggets and gold-dust. This gold they traded for a half or third of its actual value, buying the baubles and the gaudy apparel so dear to the heart of the red man. It also led occasionally to serious trouble, attempts of unscrupuous whites to obtain their secrets, sometimes even by force, usually by some chicanery.

Jamison took a course which brought him in direct and continued contact with all members of the tribe. He married one of the squaws, and after a year or two of living with the Indians gained many of their secrets. To his brother-in-law he was indebted for the discovery of an immensely rich placer. To reach it at all seasons of the year was apparently impossible.

"We shall wait until the snow falls and covers all the land," said the red brother to Jamison.

They waited for two years for such a time to come, snow not being a usual thing in that portion of the country every year. And when it came, the Indian took his adopted tribesman for a long journey, to a place of three peaks and a place where no water was obtainable, save through melting the snow, and there they gathered from beneath the white cloak much gravel, and carried it back to the camp of the Indians in three days.

Feeling assured, then, of the wealth he was to gather, Jamison wrote an old Eastern friend whose name has been lost. It is said to have been Fields. He told Fields all about

the wonderful gravel, and so excited his desire for riches that within a few months Fields had arrived at Fort Mohave. Jamison left the Indians with the excuse that he had to look after particular business in California.

Then with Fields he went to Homer, a station on the Santa Fe Railroad in San Bernardino County, California. There they purchased a span of good mules with some of the gold that Jamison had saved from his first trip, and they loaded an old buckboard with a barrel of water and a few provisions and started out, driving south into Homer Wash. From all reports they probably traveled forty miles that day and night, arriving at the diggings early the next morning.

"There we climbed a mesa," said Fields, telling of the discovery in after years. "And on top of this proceeded with our work, which merely consisted in scraping the gravel in heaps and panning it in a tub which Jamison had brought along for the purpose. The water which had been left in the barrel was used in the tub. The gravel was nearly half gold, so rich that it nearly stunned us. We became careless in our work, picking off only the coarse gold and the nuggets, and dumped the residue of fine gold and dust into the tub. It was far too much work to pan it clean."

Want of water, the bugaboo that has menaced every prospector at one time or another in the Southwest, came upon them at nightfall when they were forced to give to the two mules the water that had been used for panning. It was

less than enough to quench their thirst, and in half panic the two miners cached their tub, half full of dust, and their gold pan in a small cave which they had discovered in one of the little canyons leading off the mesa.

Then came their retreat, as ignominious as any that ever befell an army. With all their wealth they were forced to run. A panic seemed to overtake them and they jogged their mules through the desert night, trying to get to Homer before the break of day and the heat that came with it in that Summer period. With coming of dawn they found themselves in a sad plight. They had lost the trail entirely, were in a country new to them, had not a drop of water and scarcely a handful of food.

Then came the struggle with death, the terrific strain to retain the balance of their mentality against the worriment of a thousand of imps of heat and of wavering lights and shadows that dance in the shimmery waving light of the desert and drive to distraction and ultimate madness. All day long they forced their mules, stopping only long enough to catch their breath and renew their fast-waning strength.

They had to fight the mules onward, the animals balking and becoming more obdurate at every step. This sapped strength, and when chill night came, with its horrors of ghostly visions, they continued to struggle on, resting only two or three hours and then moving forward to meet the coming dawn.

With breaking light came hope. Way off in the distance

they discerned the guidepost that has led to many a salvation in the desert wastes: telegraph poles strung at regular intervals. To reach them and the railroad tracks they marked as their aim. Through three hours of tortuous work, walking instead of trying to ride behind the worn-out mules, they struggled on, their tongues lolling black from out their mouths, their throats burned to a cinder crispness, their eyes bulging in continued effort and strain.

And reaching the railroad, they could discern, just a short distance to the right, a few straggling buildings, some little outpost of civilization, with promise of water if nothing more. And this they reached eventually, pulling their mules behind them. They were found by an old miner who happened on to the broad wooden platform of the only bar in Blake during the noon siesta of the town. They were more dead than alive, and it took several hours of hard work to bring them to. For two days they were out of their minds.

Their first thought on coming to was their gold. Had they lost it? Had it been stolen? They directed search for it in the wagon, and there it lay in a large canvas sack, untouched by the men who had cared for the mules. When it was weighed, the men found themselves in possession of fifteen thousand dollars for a single day's work! The story of their find made Blake a deserted village in a few hours. A stampede for gold was on. For days and weeks it continued, but never successfully. Their trail had been obliterated in the winds that continually sway the sand from dune to dune and obliterate ceaselessly through ages.

It was a week before Jamison and Fields could travel. They packed up at the end of that time and in their swaying buckboard they drove to Needles, where Fields with his share of the gold started for the East to secure capital for development. Jamison turned his mules back to Homer then, and on back to the Piute Bend to his Indians, arriving there in a delirium caused by a relapse into fever acquired on the trip from the diggings. His squaw nursed him tenderly and medicine-men of the tribe gave him herbs, but Jamison died.

Fields came back when he heard of this. He had a chicken heart induced by past experiences, and nothing would induce him to start out alone on quest of the wealth that lay hidden in the desert near the three peaks.

He sent other men for him, giving them a map of the country as he had conceived it, but they all failed in the relocation of the treasure. Eventually he returned home, but for several years continued to write to mining men, offering them half of his interest if they could, with the aid of his map, discover the dry placer.

From one of the mining men it has been learned that the location of three peaks has not been so very difficult. Apparently they lie forty miles or so south of Homer, at the northern end of the Turtle Range. Because of the impossibility of obtaining water, more than two or three days' sojourn in the district has never been possible, and this has precluded a thorough examination of the territory. Some-

where within the region lies the immensely rich deposit. Gold has been found in all of the district in varying quantities. The Lost Tub and its contents and the mesa with its wealth are still awaiting the lucky prospector.

THE GOLER PLACER DIGGINGS

Three men rode leisurely out of the Panamint Range of mountains at the edge of that famous sink of mystery, Death Valley, and on across country toward San Bernardino, their destination. They were all on good horses, had ample packs, and ten-gallon water canteens. They rode through the heat of the day, their horses kicking up the dust of the desert and leaving behind a continuous hazy vapor which always distinguishes anything of life that moves in the desert wastes.

During the heat of the day they stopped to camp in the shade of their horses, which were watered and fed. Soon they started on. This time there was not the same certainty, the same equanimity, among them, and a quarrel arose as to the proper direction to take. They quarreled all that afternoon, and finding their water-supply practically all gone on the following morning, their words almost resulted in blows. They separated.

One of them, Frank Goler, struck out alone in an easterly direction while the other two went south. Where these two went, whatever happened to them or even the memory of their names, has been added to the many mysteries of that desert country. It was the last time they appeared alive, and in all probability succumbed to thirst and heat.

By noon of the second day, Goler had arrived at a series of low hills that lay directly in his path. He crossed them, and on the farther side discovered a canyon into which he plunged without the least fear and with renewed hope of salvation. It contained abundant vegetation, and what was more than all the rest, it carried in its deepest embrace a little mountain stream.

Arriving at its banks, Goler, nearly delirious from lack of water, gave his horse its freedom and dropped to the edge of the stream and began lapping up the cool, bright water. And while he drank, the rays of the sun, penetrating the foliage of an overhanging cottonwood, glinted upon something on the bottom of the stream—something yellow just beyond the touch of his lips.

It was a nugget weighing several ounces. There were others near it, and Goler, bewildered at his good fortune, pulled forth three of the pieces of gold and then stopped to think of food, for he had not taken nourishment for more than a day. The thought of how much longer he would be forced to travel without sustenance brought fear into his vitals. The gold suddenly lost its charm, his find dwindled into a nothingness as compared with his life and he was seized by a sudden panic to get away.

He tucked the nuggets into the bosom of his shirt, caught his horse, mounted, and then proceeded with all possible speed down the canyon, taking little time even to make proper survey of the location of the treasure. Finally, after

several hours of rough riding he came out upon a plain. Just ahead of him he saw what apparently had been the bed of a big body of water.

It was all dried out and lay in a straight easterly line with Mount San Antonio, or Mount Baldy, as it is more generally known in the Southwest. The snow-capped peak gave Goler encouragement, and also indicated the proper direction to the little mining town at the foot of the famous Arrowhead, where the Indians found relief from many ills in the waters that purled from several springs.

It required another day for him to reach this place, and when he did he was completely exhausted and his horse fearfully jaded and ready to collapse. The nuggets had worn holes in his garments and rubbed through the skin, causing serious sore places because of the fact that the alkali of the desert and fiber from his garments had worked into the wounds.

Three weeks elapsed before he had fully recovered, and then he showed the treasures that he had collected.

"Why, there is enough of this stuff to load several wagons where I found it, and I am going to bring in a load in less than a month," he assured some of his friends.

He at once set out to fit up a wagon with broad-rimmed wheels, light canvas top and a team of sturdy horses.

The day he set out, a large gathering watched him off and several prospectors followed, hoping to be in on the

wealth that he had discovered. In a few days they returned, disgusted with the fact that Goler apparently did not know whither he was traveling. In a month he came back tired out and disgruntled because he had been unable to relocate the same chain of hills and the hidden waters. Six different times he went in search of his wealth and always returned with the same story—one of reverses and loss, until finally he had spent all of the money he had accumulated in a lifetime and had to give up the quest.

It is generally conceded that the Goler discovery has since been found. His first location was in 1886. In 1891 an old and odd character, Hen Moss, who made his home in San Bernardino, started out on one of his regular prospecting trips. One of his burros wandered away from the other three, and Moss started to follow the lost animal with his entire train. It led the motley aggregation of life toward some hills in the desert which had never been carefully examined, because they were supposedly dry and afforded little opportunity for prospecting for any length of time.

The wandering burro found a canyon and in it water, and in this way led Moss to the discovery of a gold deposit. In a few hours he panned out several ounces of dust with his horn spoon and also found two or three fair-sized nuggets. The discovery went to his head. He failed to place his locating stakes and hurried back to San Bernardino to celebrate his good fortune.

For several days a very intoxicated old man swayed the entire community with his lavish expenditure of gold-dust

and nuggets. When it had been consumed in this manner he had time to sober up and come to a realization of his folly.

With borrowed capital he fitted up a second time, and when he left town he might have been mistaken at a distance for the Pied Piper of Hamelin. More than half the male inhabitants of San Bernardino were at his back, all equipped for a long journey with pack train or on horse.

Moss tried to throw them off his trail, doubled on them, returned to San Bernardino, but all to no avail.

"Guess I might as well take you along," he said one day when his patience had been frazzled to a rag.

This time he proceeded directly to the distant range in the open desert. And when he neared the canyon, those who were following him realized the nearness of the end of their journey. Moss spurred his horse ahead and left his pack train to care for itself. There were better horses in that group, and race as he might, his hand unsteady and his saddle not so well filled as others, he was overtaken and passed.

The stampeded prospectors, filled with lust for gold, had reached their goal, and old Hen Moss was one of the last to arrive on the ground of his discovery. He staked what proved to be the poorest claim of all the eighty that were staked out. The men all figured that they had come to the old Goler discovery, and thereore they so named the district, which was at once organized. The Goler District is located

in what is now Kern County, California, about twenty-eight miles north of Mojave, a little mining town on the Southern Pacific.

The creek proved one of the richest ever found in California. Several hundred thousand dollars were taken from a comparatively small area. In places the wealth was phenomenal, nuggets worth more than a thousand dollars each having been picked up with such frequency that they ceased to be special objects of interest. There were not enough of them, however, to fill a wagon. Goler was mistaken in a degree because of the fact that much of the creek-bed was filled with a very peculiar rock, one similar to all appearances to gold, but which lacked its weight and turned out to be the well-known fools' gold which has tricked many an amateur miner.

Moss did not lose courage, however. Seeing the great riches developed by those about him, he became disgusted with his little finds and finally packed up and set out. He discovered in the same range Red Rock Canyon, sometimes called "Bonanza Gulch" because of the gold it contained.

For a time he had acquired forethought, and he located the entire gulch before ever giving an inkling of what he had done. He went over the entire length of gulch, about three thousand feet, and amassed a fortune, for it produced an ounce of gold to every linear foot of the entire distance. His newly acquired wealth did him no good, as has been often related in the case of miners who have come upon their wealth suddenly: he squandered it all.

When he returned to San Bernardino or to Mojave, he delighted in bewildering the denizens of the place by his wonderful show of wealth. He would fill a quart pickle bottle with gold, and after a few drinks would throw his nuggets through the windows of some saloon merely to watch the people scramble.

He died only four or five years ago, a pauper, who had lived in his declining years on the charity of his friends.

THE LOST GUN-SIGHT MINE

This perhaps has led to as many deaths as all of the other lost mining properties together, for the reason that the Lost Gun-sight Mines has been located by its original discoverer somewhere in Death Valley, the dread sink of waterless waste that has been the basis of many a blood-curdling yarn of fabulous discoveries that have never been made public and of strange disappearances through a period of forty years.

This discovery, unlike most of the other lost mine discoveries, had silver of almost virgin purity as the basis of its worth instead of gold. Nor was the discovery a little ledge, a few veins or massive nuggets. It was a solid mountain of black sulphurets of silver located somewhere in the southern portion of the Panamint Range, and had its origin in the tale brought to the Southern California towns by a band of immigrants who had nearly lost their lives from lack of water in the valley of perpetual despair.

One of their number, Joseph Bennett, was the first to reach the confines of that mysterious waste which stretches in

length for one hundred and twenty-eight miles, and at its widest portion for twenty-seven miles, void of nearly every semblance of vegetation and containing but two or three springs af water.

Bennett was more adventurous than others of the party of immigrants and acted as trail-blazer. He wandered sometimes a day in advance of the others on the trip westward. And one day he wandered so far ahead that his water gave out and he was unable to retrace his steps. Nearly famished, he chased from one phantom spring to another, finally coming to a real one, which since that time has been known as Bennett's Hole and which has proved the salvation of many a prospector.

From there, after a day's rest, Bennett made his way back into the range that came to the edge of the desert and circled with them some twenty miles to the westward, finding eventually a good spring of water. There were a few trees, live-oaks and willows, surrounding the spring, and, suffering still from the days of his ceaseless chase for water, he remained there a week. It was on one of these days that he happened to notice the metallic quality of some of the rock that surrounded him.

He made closer investigation, and although lacking all sense of the prospector and with no mining experience to tell him right, he realized that he had stumbled upon a wonderful deposit of silver. The croppings came from a number of ledges and were all black with the corrosion of some

sulphate. He broke off a number of large chunks of the metal and then started again on his journey to a place of civilization.

That journey, like many others of similar character, has gone down in history as one of fearful hardships, despair of ever arriving at a goal, and, during the final days of struggle, despair of ever finding water or food again. He was discovered by another prospector and brought into Needles more dead than alive, but still clinging to the silver that he had found.

For weeks he was insane, and when he finally came back to his senses he had lost all reckoning of distance traversed or the exact locality of the immense silver deposit. When he had sufficiently recovered he started out to relocate the property. He failed a second and third time in his endeavor.

On the last two trips he made he carried with him a gun on which he placed his faith for unerring aim. He purchased the gun, an old rifle, from a miner who was down and out, and the weapon having no sight, he had the blacksmith fashion one from the silver ore which he carried. With this he wandered through mountains and valley after valley, hoping to be able to shoot into the ledge which contained the original metal of the sight. He failed, as did his friends who attempted to follow his directions.

A record of a score of deaths has been laid to this discovery because of the men who have started out for it and have never returned, leaving perhaps their bones to dry out and blow away on the parched sands of Death Valley.

LOST MINE OF ARIZONA

In the last century, one of the most notable mines of what is now Arizona was the one called the Planchas de Plata, the "planks of silver." Its exact position is unknown now, though the neighborhood in which it was found is plainly indicated by the old records and letters. Don Manuel Retes, now Captatin of the port of Mazatlan, thus spoke of this mine, in an essay on the mineral resources of Northern Sonora:

"This mineral deposit, situated 31½° north, long. 111½° west of Greenwich, is described by the Jesuits as having been discoverd by a Yaqui Indian, towards the commencement of the last century, distant from four to five leagues from the line of Arizona; about fifteen from the town of Tumacaicori, the nearest settlement; about twenty-five from the Presidio of Santa Cruz; nearly ninety from Ures, and about one hundred and thirty from Guaymas. The silver was discovered in sheets of different size, from which the name of Planchas de Plata, 'sheets of silver,' originated. They were found almost on the surface, perfectly pure, and without adhering to any foreign substance; in a flexible state, capable of receiving impressions, and only hardening on being exposed to the atmosphere. The region which produces the same is an earth of the color of, and very similar to, ashes, which extends in visible leads more or less wide, and in parts subdivided in veins, over all the hills and mountains adjoining the main deposit. Among the sheets extracted, two are worth mentioning—especially one which on

acount of its almost fabulous size, weighing one hundred and forty-nine arrobas, it was found necessary to employ the heat of four forges at the same time to reduce to a smaller bulk—the other weighed twenty-one arrobas, though according to other accounts it was much larger. The news of such immense lumps having been found, without the investment of much labor, could not fail to convoke a great number of people to that region, not only from the neighboring settlements, but also from the most distant provinces. The amount of silver extracted within a very short period, amounted to 400 arrobas, or five tons.''

Another mine very rich in silver was the Arizona; the position of which is also lost. It was in search of this mine that Count Raousset de Boulbon made his celebrated expedition into Sonora, whither he went, at first, in good faith and with peaceable intentions, though after he had been defrauded and atacked, he turned filibuster. There are persons who are ready to assert that the exact position of the Arizona mine is known; but the best informed say it is not.

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